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MODEL AIRPLANE NEWS



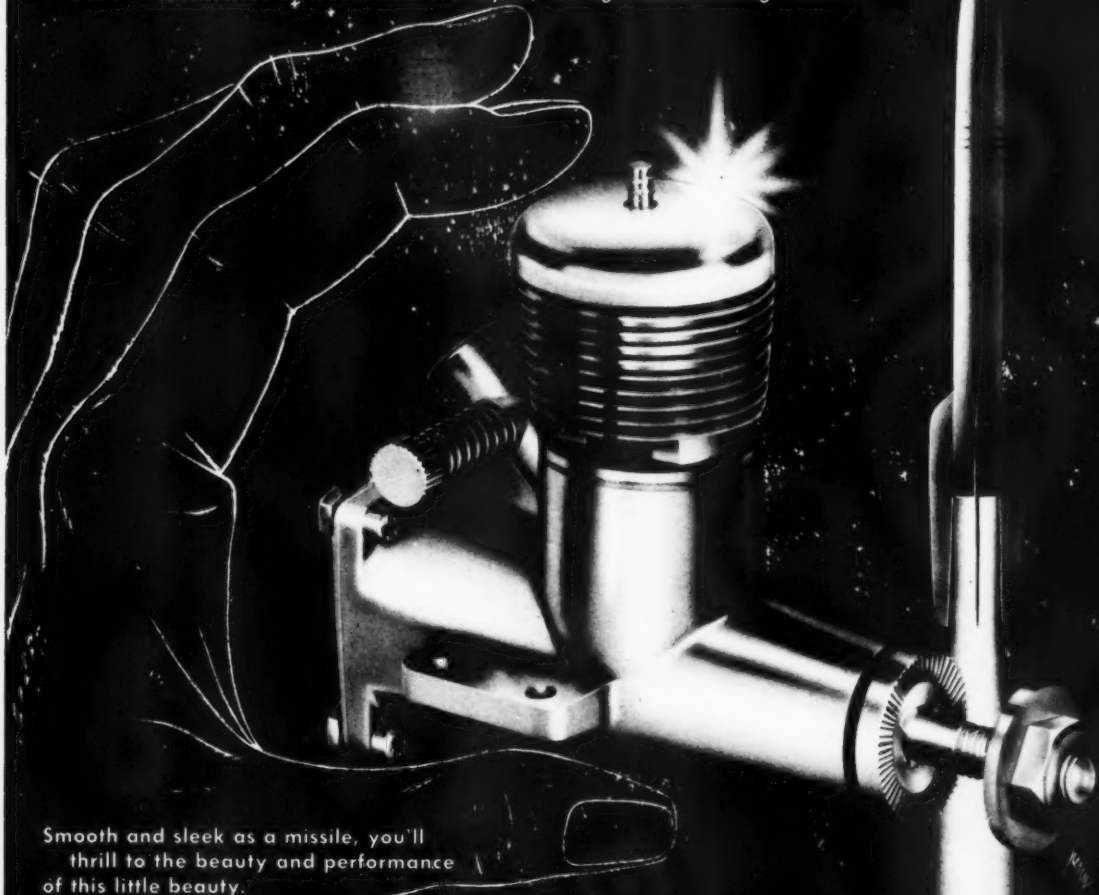
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Foreign Notes

F.A.I.

At this writing it is still not known where and when this year's World Championships will be held. The 1959 events should, by previous agreement, have been held in the U.S.S.R. (for the first time) but just before the recent annual conference of the FAI Models Commission, it became known that the Russians would decline.

Two alternative locations have been suggested, namely, Hungary, (as the most successful nation in international events in 1958) and West Germany—possibly a USAF airfield such as Wiesbaden, where the 1955 World Championships were held. Meanwhile, pending a final decision, Belgium has agreed to take care of the A.2 glider event, provisionally fixed for August 22-23.

World Championship events apart, eleven International meets are listed on the FAI calendar for 1959. All are European events and will be held in Austria, Belgium, Finland, France, Germany, Hungary, Monaco and Yugoslavia. Many of them however, are likely to receive only limited support—perhaps four or five neighboring countries competing. The exception is the 10th annual Belgium Criterium d'Europe control-line meet, which is likely to attract upwards of a dozen teams from both sides of the Iron Curtain.

Teams for World Championship events are, in future, to be limited to three contestants and a team manager. This will place less of a financial burden on both the competing countries and the organizers.

National identification letters are now to be carried on all separate parts of models and must be at least 3 cm. high on wing and 1 cm. on fuselage, stabilizer and vertical fin.

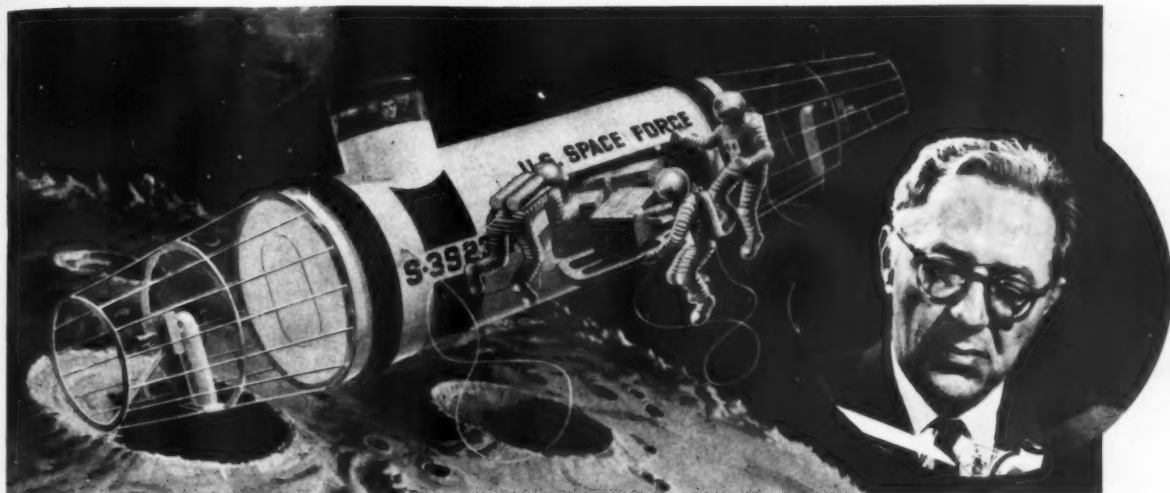
M. Albert Roussel of Belgium becomes the new President of the FAI Models Commission. He succeeds Mr. Alex Houlberg of Great Britain who, after many years in office, did not stand for re-election, due to business and other commitments. Herr. Hans Meier of Germany has been re-elected Vice-President.

The FAI Merit Certificates scheme—the Class C or International Certificate was supposed to be the Silver-C of the model world—has been dropped. For many years, the scheme has failed to attract the attention envisaged for it. In Britain, for example, only about 1000 modelers obtained "A" certificates, fewer still reaching the "B" grade, and only a handful qualified for the "C" Certificate. Final qualification was for three officially observed flights of not less than three minutes in all free-flight classes: rubber, glider and gas.

New FAI model rules include the establishment of International rules for Indoor Models. These are based on suggestions submitted by the U.S.A., Great Britain and Hungary and will be given their first try-out at the International Indoor Meet to be held in Hungary in May.

Revisions to existing rules apply to Control-line, Radio-Control and F/F Power events. In FAI control-line Aerobatics, inverted flight has been deleted from the schedule and the triangular loop and four-leaf clover introduced instead. In Team Racing, the maximum number of pilots is reduced to three and the maximum height

(Continued on page 30)



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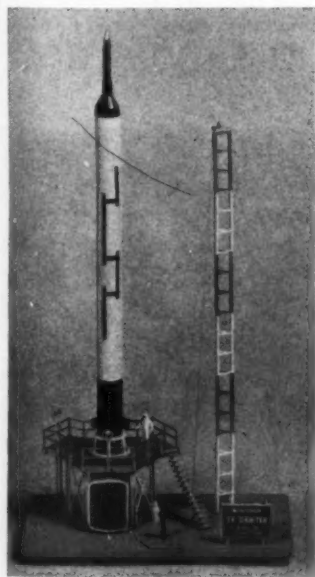
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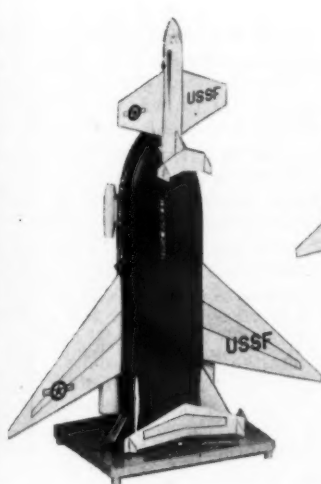
Founder of pioneer German Rocket Society and member of American Rocket Society. Writer on scientific subjects. Conductor of syndicated newspaper column on rockets and missiles. Lecturer. Consultant. Among his books are "Conquest of Space," "Exploration of Mars," "Rockets, Missiles and Space Travel." Willy Ley Space Travel Models by Monogram are the first such models to be designed by a world-known scientist and to be based on scientific study and fact.



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30th Year of Publication MODEL AIRPLANE NEWS

JAY P. CLEVELAND, President and Publisher
April 1959 Vol. LX, No. 4

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by
William
Winter



► For 13 years this column has touched on many subjects, serious and ridiculous, sad and funny. There is nothing funny about this month's column. For our friends in California have said, in affect, "The pages of MAN have always been open to everyone, now do something about the new rules!" So be it.

MAN's opinion of the new rules already is in print. In last month's column, it was stated that the rules were an intelligent compromise between the worldwide FAI rules, and the National AMA rules, and that it was hoped everybody would be happy. Wishful words! As this is written in mid-January, the air is sulphurous with protests, character assassination, threats, and demands that the rules be rescinded. Facts and false assumptions have been mixed as blithely as dope and thinner.

Like the plot in an English movie, this discussion will be slow unfolding. In brief, therefore, we must report the sensational statements and charges and demands presented by, if we go by noise, most of the Californians (they have their own dissenters, too). We must then examine the truth, or lack of truth, of these arguments, before a conclusion can be drawn.

The proper starting place is the protest widely circulated by Bob Hunter. By correspondence, phone calls, and telegrams, it has been confirmed that this protest represents the feelings of most, but far from all, Californians, and probably many people throughout the country. The three-page protest makes these charges:

1. Instructions were given to the Contest Board Members to disregard

vote of membership. 2. Rules changes without consulting membership. 3. Rules change proposal booklet a waste of membership funds. 4. Model Aviation has, in many instances, stressed accident prevention, however, the new free flight power loading rules are totally to the contrary, if mass velocity is considered. 5. Separate FAI rules already in affect for 1958, therefore, such a drastic change in rules should not be necessary. 6. Combining events will work a definite hardship on the engine and kit manufacturers and the entire retail and wholesale hobby group.

The protest also includes quotes from manufacturers Brodbeck (K & B Allyn), Roy Cox, and Hi Johnson. It lists the important rules changes which, truly, are big ones, and presents a list of five sug- (Continued on page 30)



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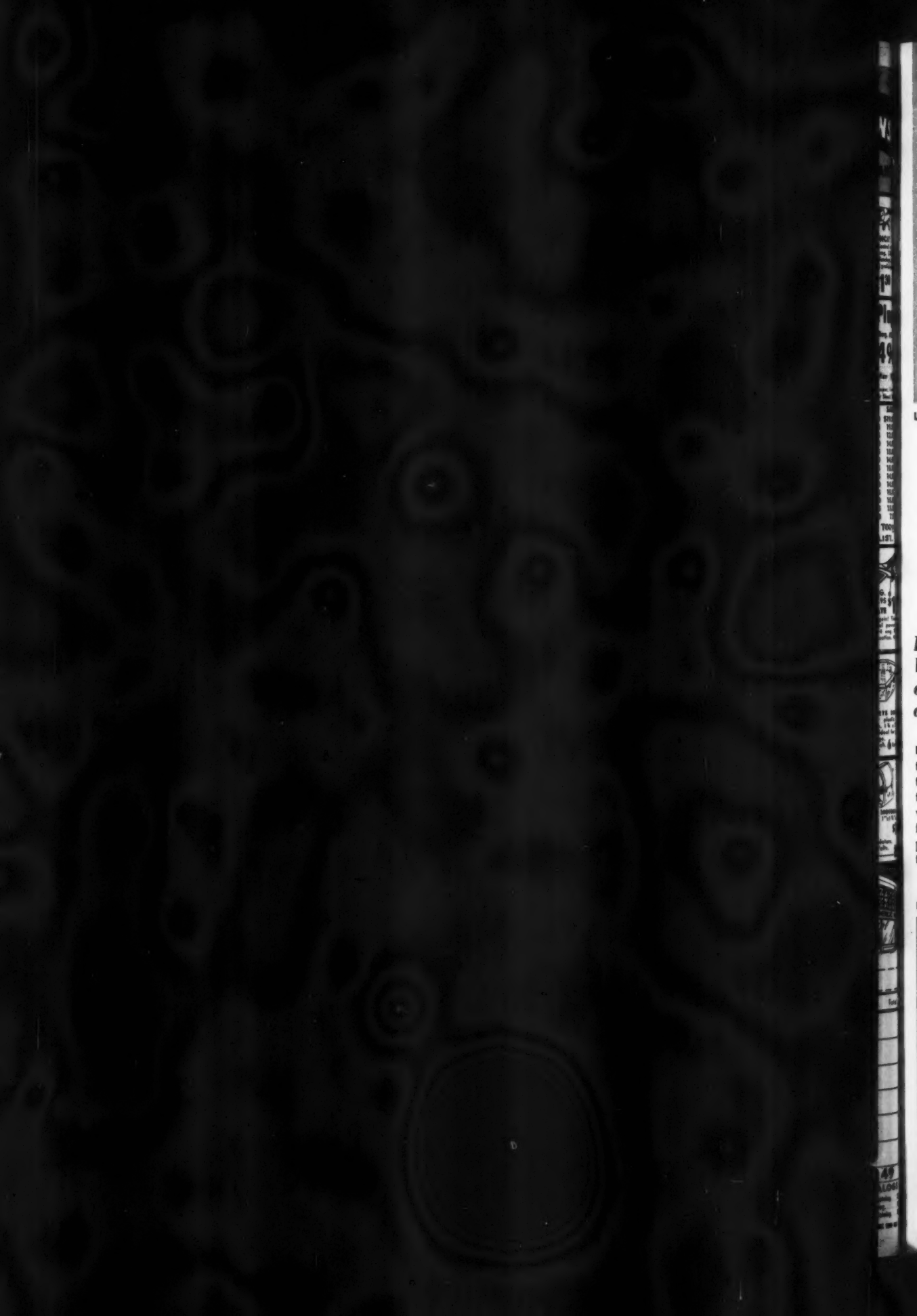
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Look, ma, bzzzz, like a jet! Tubby Twin Lizzie heads for the blue. Can't see it, but the rascal sports an eye dropper tank, to'ther side.

TWIN LIZZIE

by KEITH LAUMER

For Half-A engines—and the little Pee Wee is just fine, a joyful free flight design for sport flying. Has character all its own—Disney character, maybe?

► It's a perfect day for flying; the runway is smooth and the air is calm. Engine humming, Twin Lizzie starts her take-off run; the tail skid clears the ground, and with a tentative bounce, she's airborne, climbing steadily in a wide turn that brings her back directly overhead with 50 feet of altitude. The sun glints off her side as she swings past to make another circle, climbing to 100 feet before the engine cuts.

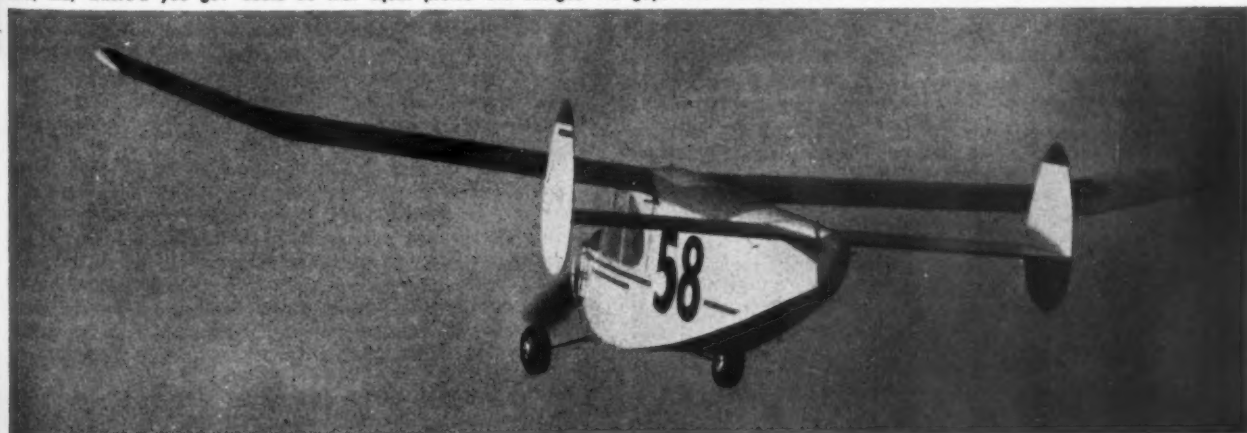
In the glide, the ship drifts back toward the runway, rocking slightly in an occasional gust, to float in to a perfect landing, ready to go again.

That's the way Twin Lizzie flies, and construction is easy, with a simple box fuselage, sheet balsa tail surfaces and constant chord wing. If you're a beginner or an old timer you'll find Twin Lizzie fun to build and fly.

Fuselage: Let's begin by cutting out the sheet balsa fuselage parts. There are two plywood parts, two $\frac{1}{8}$ " sheet-balsa parts, and seven $\frac{1}{16}$ " sheet-balsa parts. Lay out the first side directly on the wax paper-covered plan, cutting two of each piece as you go along. The second side is built over the first, and the two sides are allowed to dry before removing from plan, sanding and separating. While the sides are drying hard, bend the $\frac{3}{32}$ " wire main landing gear to shape as shown on plan and lace to plywood part No. 4 with No. 30 linen thread, coating lacing heavily with cement. The $\frac{1}{32}$ " piano wire tail skid is bent and sandwiched between the two parts 13. The fire-wall (plywood bulkhead No. 1) is drilled for a radial mounted engine, such as the Cox Pee Wee, and retaining nuts are cemented in place on the back, reinforced by a strip of hard balsa notched and cemented over them.

The two sides can now be joined on part No. 4 and $\frac{1}{8}$ " sq. cross strip can be placed across the bottom in notches as indicated on the plan. The cabin roof, (part No. 3), is scored on the bottom center line, and cracked to the angle

Heh, ma, where'd you go? Could be that squat profile will intrigue the guys who make full-size home-builts. Room to sit and look out.





Mac G49 Diesel shows here. Tubby, oops, Twin Lizzie, with papa. Pop turned out a veritable flying circus of crates when in Burma.

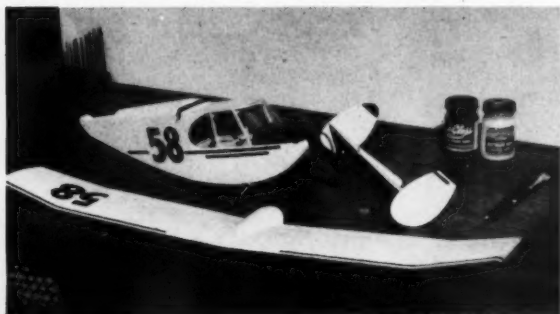


Number 58 flits by with an Atwood snarling away up front. Twin tail design is a refreshing change—can see that eye dropper tube now.



Puff, puff—the old man thinks I can fly all day long! Scairt, you beginners? Shouldn't be. Two side frames, crosspieces, just a box!

Cinch to transport, that's the T-Liz. And the wings and tail knock off real easy like, if you fly it into a tree—always free around!



TWIN LIZZIE—continued

shown on the front view, after which the front wing retaining dowel, bent from 1/16" piano wire, is cemented in place and cross pieces, cut from 1/8" x 1/4" balsa as shown on front view, are added to the underside, between the notches. The cabin front posts now are cut from 1/8" sq. balsa and cemented in the front notches in part No. 3. The cabin roof assembly is cemented in position on fuselage frame.

Next, the front ends of the fuselage sides are drawn together and attached to part No. 1, being held by a rubber band until dry. The rear ends are similarly drawn in and part No. 12 is cemented in place. The cross pieces of 1/8" sq. balsa are cut to length as shown on top view and placed top and bottom. The tail skid assembly should also be added now, placing cross pieces both in front of and behind the skid.

Formers 2, 8, 9, 10, and 11 are now added and 1/16" sheet stringer is added in notches from 8 to 11. The 1/32" sheet balsa top skin is now cut to shape and cemented in place. A 1/8" x 1/8" stringer is placed between parts 1 and 2, and the cabin side posts are added.

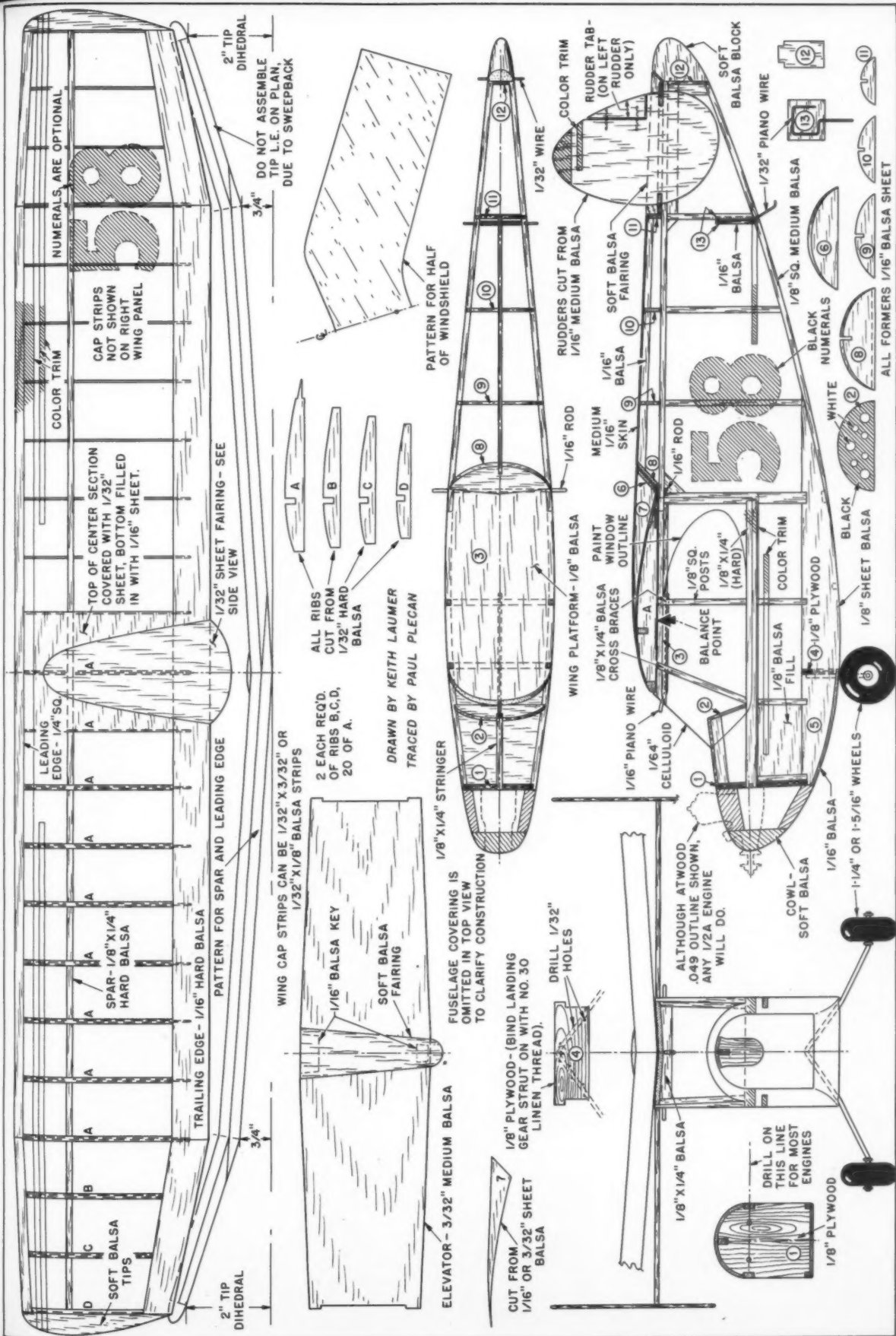
The 1/8" balsa panels for side filling are cut to shape and placed. If a separate tank is to be installed, it should be mounted now before adding the 1/16" sheet balsa bottom cover, from station 1 to station 4. The interior of the tank compartment should be fuel proofed. The top cover, of 1/16" balsa, is cut to approximate shape using a paper pattern, soaked in water, and held in place by rubber bands to dry. When dry, the cover should be fuel proofed thoroughly and cemented in place.

The cowl sides of 1/8" soft balsa should be cut to the shape shown on the side view and cemented lightly in place. The 1/8" soft balsa cowl bottom and 1/8" top now should be placed, cementing lightly to firewall, but liberally cementing to cowl sides. The front piece of the cowl assembly now is added with plenty of cement and the assembly left to dry for at least two hours—before shaping with a sharp knife and sanding to final contour. The soft balsa block should be cemented to the rear of the fuselage and the balsa tail fairing block cemented lightly in place. In order to shape the fairing properly, a temporary filling block of 3/32" balsa is placed under the fairing in the position the elevator will occupy. When dry, the fairing block and tail block are shaped and sanded and the fairing removed.

The entire fuselage should be sanded carefully with fine sandpaper using a sanding block, after which the cowl is removed and openings are cut to fit the engine used. The cowl and front portion of the fuselage receive a thorough fuel proofing. The fuselage, including planked and filled surfaces, is covered with light weight Silkspar. The paper can be applied most easily using modest amounts of liquid mucilage. When the mucilage has dried, the tissue should be dampened with water, using a very soft brush or spray, preferably the latter. When dry, give the fuselage a coat of clear fuel proof dope, and sand lightly. The 1/16" wire wing mounting dowel and 1/32" tail mounting dowels are cemented in place as shown on plan.

Wing: Select a straight piece of 1/8" by 1/8" hard balsa and lay out the spar as shown on the front view of the wing. The leading edge, of medium 1/8" sq. balsa, is laid out on the same pattern. Note that, when adding the tip portions of the leading edge, they should be swept back 1/4". The trailing edge is built up from hard 1/16" balsa. The bottom half is beveled as shown on side view before being cracked to the proper dihedral angles as shown on front view. These cracks should be liberally coated with cement.

Next, cut out the wing ribs. Ribs A can be simply made by first cutting 20 blanks (Continued on page 44)



FULL SIZE PLANS AVAILABLE. SEE PAGE 60.

Early Birds

by DOUGLAS ROLFE

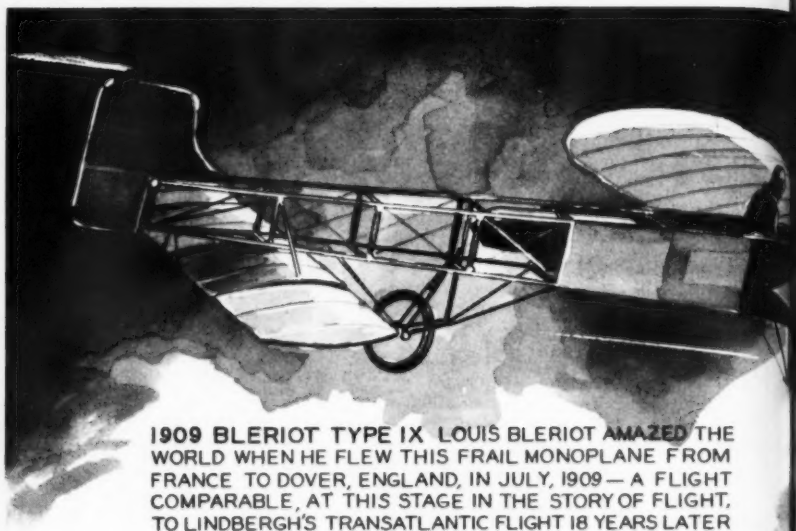
Number 5

DEVELOPMENT OF THE MONOPLANES

In a previous installment, the first monoplanes were reviewed. Now, roughly from 1909 till 1911, vast strides were made in design. Bleriot's first overseas flight alone established the monoplane as a successful type and did much to put France well ahead in aircraft design.

The 1911 Bleriot "Canard", the speedy little Nieuport and, above all, the fabulous and fantastically advanced last Antoinette, all points to the superiority of French design at this period in the history of the airplane. It is also worth noting that the early Handley Page monoplane in England was built around the crescent-wing concept—a concept on which the present day Handley Page Victor jet bomber relies. By contrast, the Blackburn monoplane shown was a more or less borrowed design with a strong Antoinette flavor.

The first German airplane, the Grade, obviously was patterned after the Santos Dumont "Demoiselle" (E.B. Oct., 1958). Design apart, what gave the French such an enormous lead at this stage of powered flight was the introduction of the rotary, air-cooled Gnome engine. Temperamental and, by today's standards, inefficient, it was probably the only really effective aircraft engine obtainable during this period.




1909 BLERIOT TYPE IX LOUIS BLERIOT AMAZED THE WORLD WHEN HE FLEW THIS FRAIL MONOPLANE FROM FRANCE TO DOVER, ENGLAND, IN JULY, 1909 — A FLIGHT COMPARABLE, AT THIS STAGE IN THE STORY OF FLIGHT, TO LINDBERGH'S TRANSATLANTIC FLIGHT 18 YEARS LATER




1911 BLACKBURN SECONDEFFORT BY THIS STILL RENOWNED AIRPLANE FIRM WAS CONSIDERABLE IMPROVEMENT OVER FIRST DESIGN (SEE E.B. OCT. 1958). TRIANGULAR FUSELAGE, TAIL SURFACES, INDICATE MARKED INFLUENCE OF THE EARLY ANTOINETTES ON DESIGNER OF THIS AIRPLANE. NOTE THE 3-CYL Y-TYPE RADIAL




1911 BLERIOT CANARD LITTLE KNOWN TODAY THIS EARLY TAIL-FIRST DESIGN WAS NOTABLE FOR SUCH ADVANCED FEATURES AS WING TIP RUDDERS, SPLIT-TYPE LEAF SPRING LANDING GEAR, PUSH-PULL CONTROL RODS AND CAREFUL STREAMLINING. ODD MOUNTING OF THE GNOME ROTARY ENGINE BEHIND THE PROPELLER WAS OFTEN EMPLOYED BY THE DESIGNERS OF THIS PERIOD...



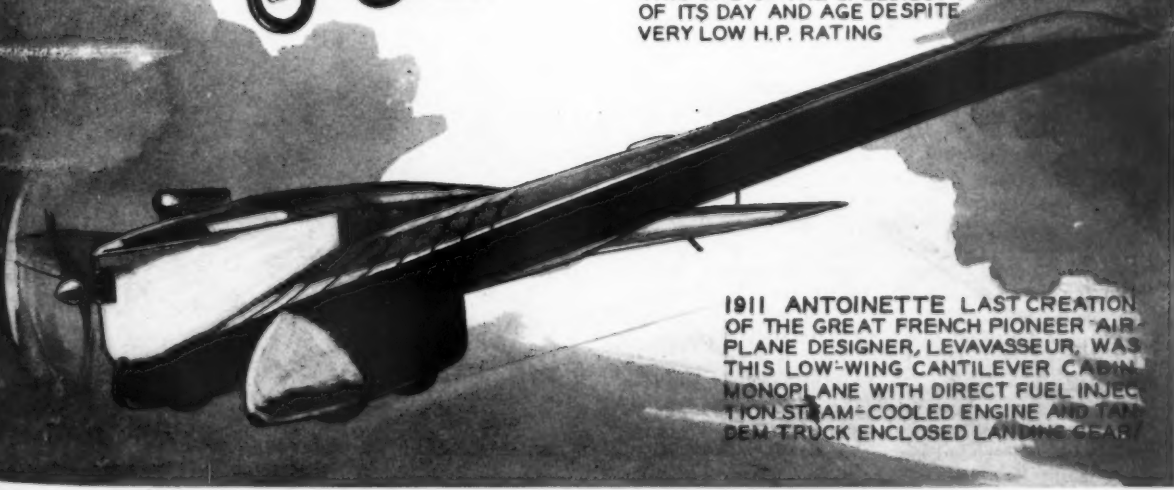
1909 GRADE FIRST GERMAN AIRPLANE TO FLY. DESIGNER, BUILDER AND PILOT, HANS GRADE, ALSO CARRIED FIRST PIECE OF AIR MAIL IN THE WORLD



1911 HANDLEY PAGE THIS GRACEFUL MONOPLANE WAS ONE OF THE FIRST OF THE NUMEROUS DESIGNS WHICH HAVE RESULTED IN THE WORLD-WIDE REPUTATION FOR FINE AIRCRAFT WHICH THIS PIONEER FIRM HAS SO RICHLY EARNED



1910-11 NIEUPORT DEEP AIRFOIL SECTION FUSELAGE, IMPROVED WING CAMBER, MADE THIS ONE OF THE SPEEDIEST PLANES OF ITS DAY AND AGE DESPITE VERY LOW H.P. RATING

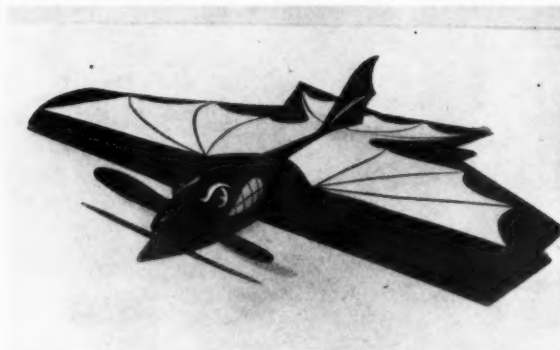
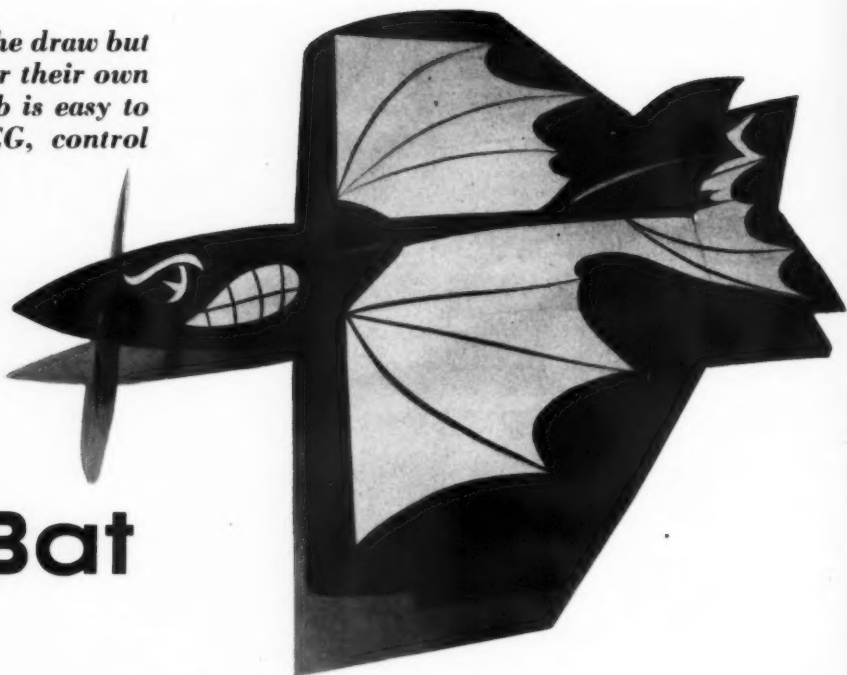


1911 ANTOINETTE LAST CREATION OF THE GREAT FRENCH PIONEER AIRPLANE DESIGNER, LEVAVASSEUR, WAS THIS LOW-WING CANTILEVER CABIN MONOPLANE WITH DIRECT FUEL INJECTION STEAM-COOLED ENGINE AND TAND-DEM TRUCK ENCLOSED LANDING GEAR

"Wings" are quick on the draw but sometimes too tricky for their own good! For 35's, this job is easy to build and fly. Right CG, control set-up, for stability.

by EARL CAYTON

com-Bat



Cowl and paint job are optional, of course, but it is encouraging to know that new rules disqualify the guy who hits enemy in air.

► Com-Bat is an extremely simple to build combat and sport model which is fun to fly, yet having a novel appeal which sets it off from other present day combat craft. Construction is super simple. With the cowl and distinctive paint job you have a model that is a real eye catcher on any flying field. Without the cowl and painted trim construction time is at a minimum and building time is reduced to one evening to replace combat losses at contests. Ruggedness is another virtue of the Com-Bat.

To add a change of pace to combat run of the mill models, a J. Roberts bellcrank unit can be used in conjunction with the new K&B Torpedo .35 with throttle control. With engine speed control, an astute combat flier can add new tricks to his combat strategy. If variable engine speed is not desired, any large control horn, such as Veco, may be used. Also, any .25 to .35 displacement engine will power the Com-Bat very nicely.

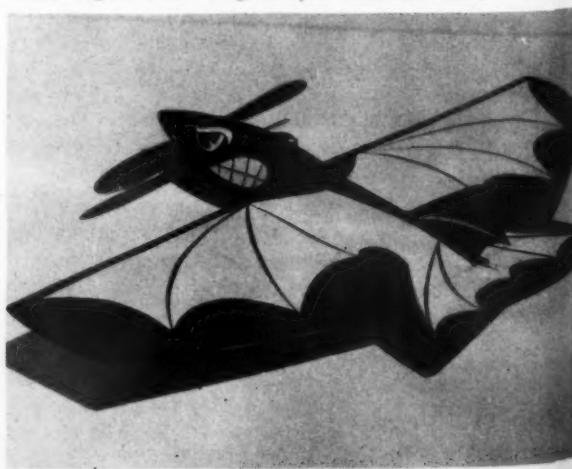
Fuselage: The fuselage is basically the profile type which is simple to construct. The profile is simply cut from a sheet of rock hard balsa stock size $2\frac{1}{2}$ " x $\frac{1}{4}$ " x $14\frac{1}{2}$ ". The $\frac{1}{8}$ " plywood sandwiched on each side of the profile suffices easily for the engine mounts. The engine is

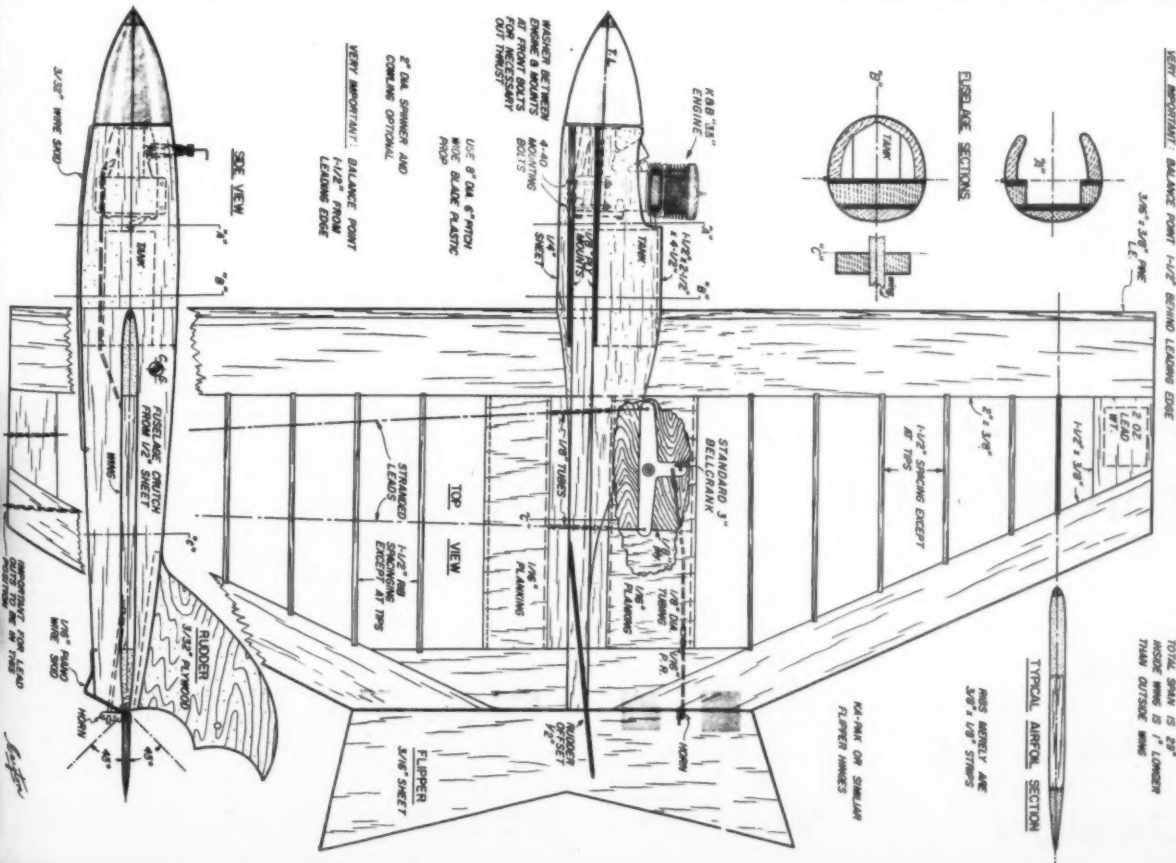
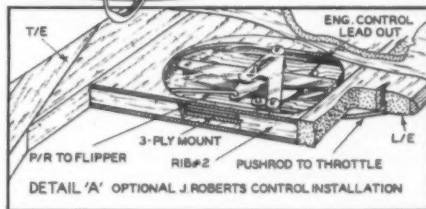
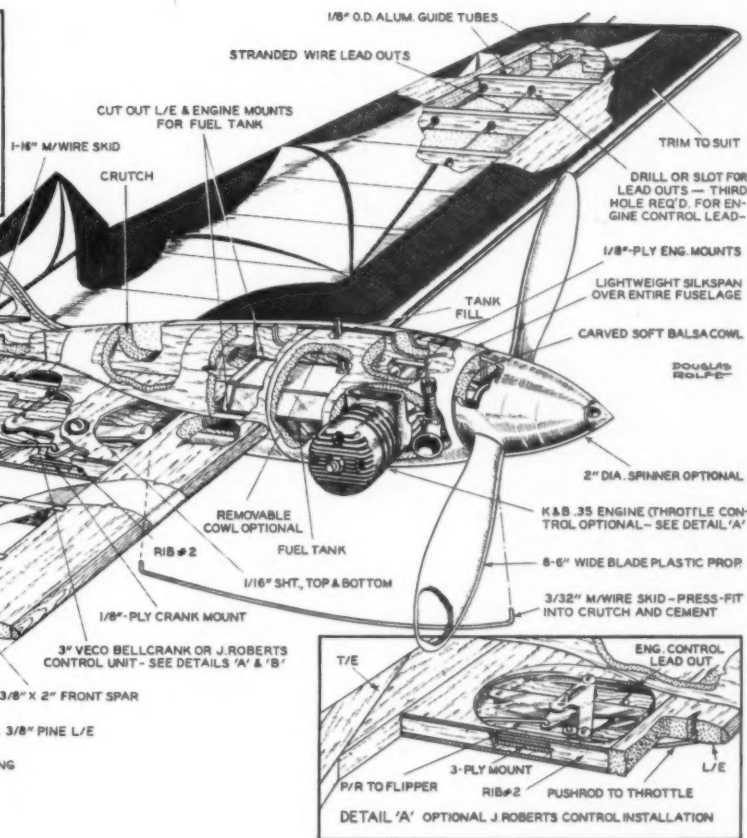
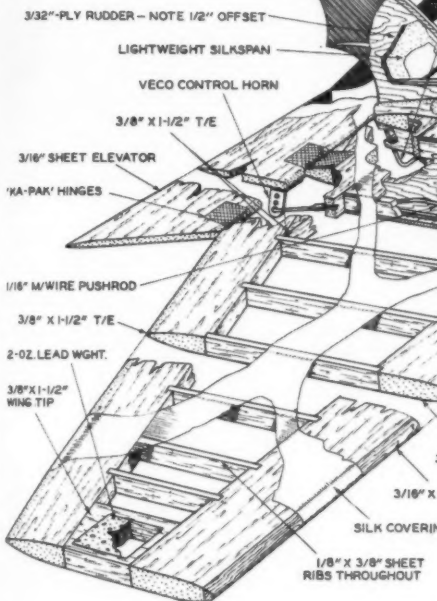
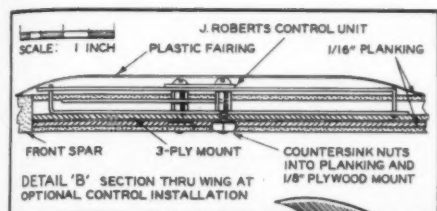
mounted with four #4-40 bolts. Put a fairly thick washer between the engine and mounts at the front mounting bolts. This will provide some outthrust to insure the model staying tight on the lines at all times. After you have chosen a good commercial tank, or constructed your own pet design, mount it in position with rubber bands. Do not mount permanently until wing is installed.

Wing: The wing also is simple. First cement a strip of $3/16$ " x $3/8$ " pine to one edge of a sheet of medium balsa 2 " x $3/8$ " x 30 " which is a combination leading edge and spar. This pine leading edge helps protect the wing leading edge from the frequent bashing in incurred during combat events. The trailing edge and tips are formed from $\frac{1}{8}$ " x $1\frac{1}{2}$ " sheet. Ribs merely consist of $\frac{1}{8}$ " x $\frac{1}{8}$ " balsa strips. This doesn't form any super airfoil of any sort, but it makes for quick easy construction and flight characteristics are good which is what really counts.

The center section is formed from a sheet $1\frac{1}{2}$ " x $\frac{1}{8}$ ", same stock that is used (Continued on page 56)

For a combat job, Com-Bat is darn good looking. Covering is your choice; original silked wing, Silkskan elsewhere. Clear, 3 thin.





VERY IMPORTANT: BALANCE POINT 1-1/2\"/>

TOTAL SPAN IS 29\"/>

FULL SIZE PLANS AVAILABLE. SEE PAGE 60.



Rucie, one of the author's many contest winning gliders, some of trophies it brought home. Its best time was 1:13.6 in the hangar at Lakehurst, N.J. Same design twice took Indoor Open Nats event.

Proving that rule-of-thumb "quickies" have no place in modern competition, a memorable series of four articles about the "simple" chuck glider. A many-times winner, this expert knows his business.

the hand launched glider

part
one:
Design



Type of Glider	Type of Dihedral	Dihedral Factor
Indoor	Polyhedral	0.10 x Span
	V Dihedral	0.12 x Span
Outdoor	Polyhedral	0.14 x Span
	V Dihedral	0.15 x Span

by WILLIAM DUNWOODY

► Mention hand-launched gliders to most modelers and the chances are you'll get a reaction of "what is that" from the corner lot yo-yo flier or "kid stuff" from the RC fan. Modelers of more varied experience will probably refer to the outdoor variety of hand-launched glider flying as a "dice game" and to its indoor counterpart not at all. To those of us who fly them, hand launched gliders, indoors or out, are every bit as challenging and interesting as the most complex radio model.

A hand-launched glider can be built by anyone, at very little expense, and no model, no matter how complex or costly, is aerodynamically different from it. Heavier maybe, faster too, but the basic problems of lift, drag, power, stability, control and structure are the same in a hand-launched glider as in any airplane.

To those who would say, "You have to have a strong arm," or "A simple model like that isn't any fun," I say only that anyone willing to take the time and trouble (not very much of either is required) to do it right will find the results more than gratifying. Nowhere in all of modeling are the returns so great for such a meager investment.

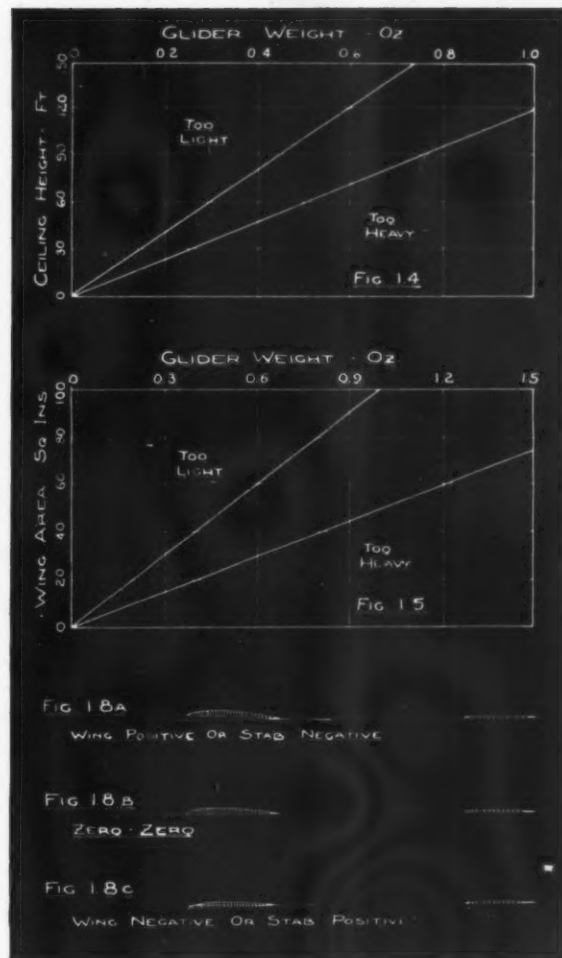
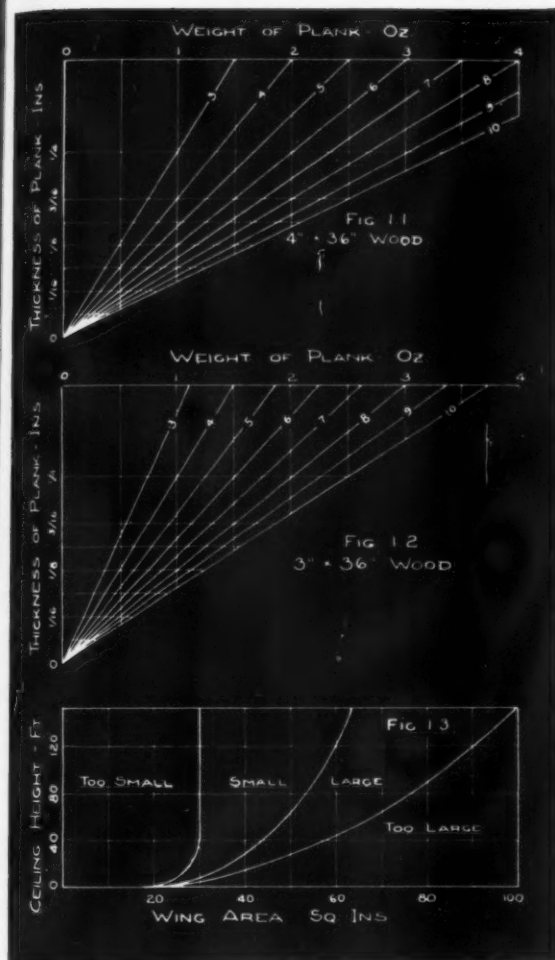
There is a world of difference between indoor and outdoor glider flying. That outdoor glider flying is all "thermal luck" and indoor flying no luck at all is equally untrue. The "luck" involved in winning performances indoors is not of the thermal catching variety, but the luck which guides you to the wood rack at the hobby shop just when there is some top notch wing stock to be found there and the luck which keeps your creation out of the ceiling beams on its first test flights. Outdoors all this is not enough and to it must be added the chanciness of thermals and weather.

Possibly, you are interested now and want to get started, but how? The answer: get the wood. This sounds easy but it really isn't. If you have never built a glider before, the selection of wood for your first couple of gliders will not be very important, but as your building and flying skills improve, so should the quality of wood you use. Good wood is hard to get so that, should you be new to gliders, and should you be fortunate to find wood which meets the specifications outlined below, I strongly advise against using it on your first few attempts. It would be shameful to waste it on a basic training program.

The most important piece of wood in any glider is the wing, which is about 60% of the model's weight and must have other aerodynamic and structural characteristics important for top performance. Of greatest importance in selecting any piece of wood for use in glider is its weight, secondly its condition and thirdly its grain.

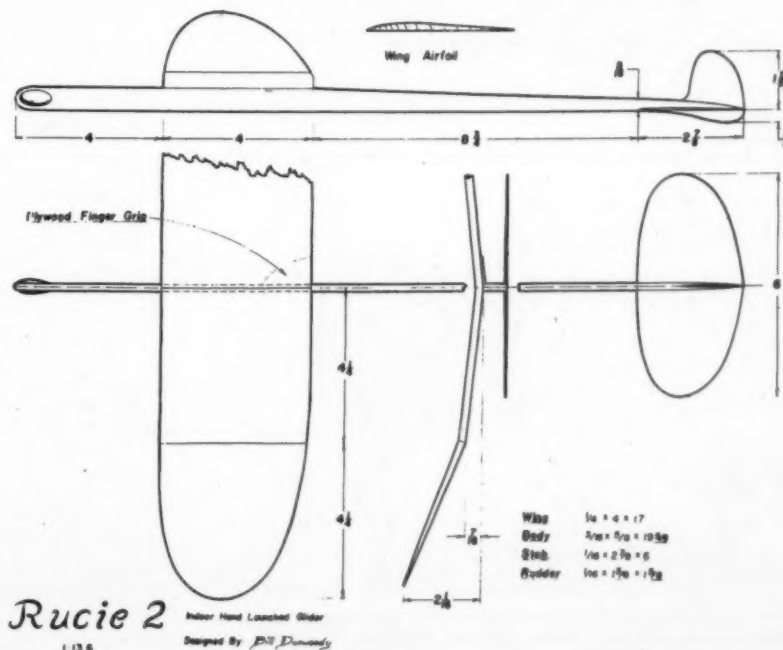
In discussing wood, the term density often is used. This is the weight of one cubic foot of wood. The charts in figures 1.1 and 1.2 show the density for various weights of standard size sheets of balsa wood. If it is possible for you to take a scale with you when buying wood, by all means do so; if not, then learn to "feel" the difference between "light" and "heavy" wood. On high performance indoor gliders, wing stock of four or five pounds density is

Sketches (more later) from action snaps reveal many odd, useful tips on launching. Surprisingly, both feet off floor this shall



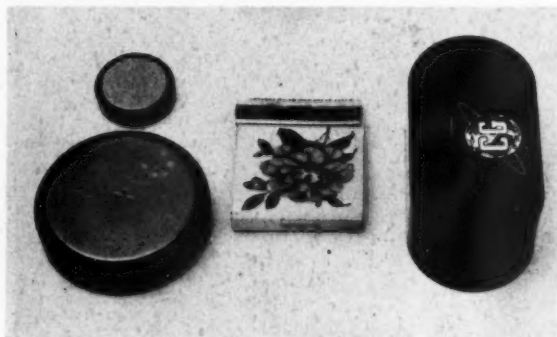
most desirable, five or six pounds for the tail surfaces. Outdoors, somewhat heavier wood can be tolerated, five- to seven-pound wood can be used for both wings and tails. For the beginning gliders and for sport gliders even heavier wood, up to nine-pounds density, can be used if care is taken to use smaller cross-sections to keep the weight down.

In speaking of the condition of a piece of wood, I refer to the flatness of it and to its surface finish. A piece of wood which has any twist in it at all should be immediately rejected. Even if it were practical to trim such a piece to proper flatness, carving the airfoil and planform into it would relieve stresses in the wood causing further warping. Wood which has a great variation in hardness from one edge to the other or with hard or soft spots in it should be rejected for the same reason. Deep nicks in the wood are to be avoided because they will have to be filled and the filler weighs much more than balsa (Continued on page 56)

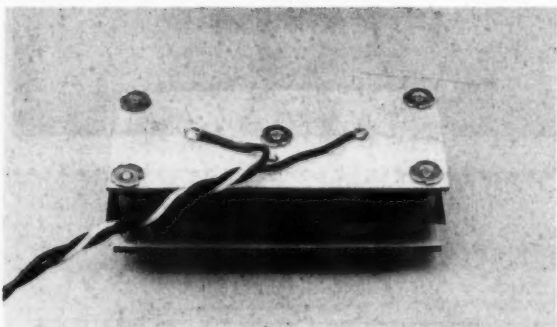




When part one of this article was written, the above batteries existed. Top, pack VO-500's, then, clockwise, VO-250, VO-100, a VO-500, and VO-800. Compare size with a book of paper matches.



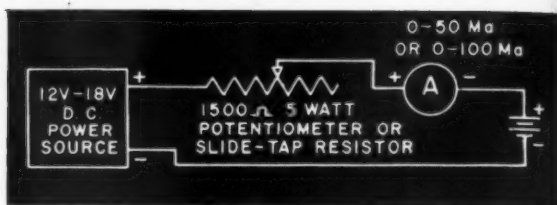
Newly added to VO line, top, left the VO-180; beneath it, the big 1750 and, at right, the potted servo pack of four VO-500's.



Homemade holders giving good contact, as described in article, look like this. The one shown accommodates four of the VO-500's.



Another type of holder, this time taking two VO-250's, attached directly to can of 3-volt receiver. Numbers show ma hr. capacity.



Schematic for charger that will give proper service to the VO's.

new look in batteries

by FRED STONG

Concluding a discussion of the rechargeable "VO" batteries that offer exciting advantages not possible in dry cells.

► The specs for the two latest VO batteries ie, the VO's-180 and 1750, were included in the Battery Specifications Chart of Part I, and the photo in this issue shows their physical appearance. Also included in the photo is a potted servo battery pack. This unit is a prototype, but should be generally available in the near future, is wired ready for multichannel servo use, and is comprised of four VO-500's. Its capacity is sufficient for a good day's flying of even the largest multichannel systems. The pack measures 3" x 1 1/2" x 1" and weighs 5 1/2 oz. It is designed after larger units made for military applications where operation is expected during and after 2,500 "G" impacts. Vibration and weather don't affect it. Salt water won't corrode it.

Low voltage (3-4 1/2 volts) transistor receivers are becoming more and more popular. VO batteries, especially the VO's-180 and 250 are ideally suited for powering these receivers. Dry cells, many times, do not satisfactorily power both the receiver and actuator simultaneously, because of the high internal resistance; in spite of spark suppression, the actuator's discharging pulse is developed across the internal resistance of the dry cells, possibly retriggering the receiver. This can produce skipping, chattering, and all kinds of crazy malfunctions. The internal resistance of VO's is so low that virtually no feedback can occur. Spark suppression is still necessary to protect the receiver relay, however. A pair of VO-250's on a single charge will power an RTI-3V and a Vari-Comp for at least two good days of flying—25 or more average flights. For 3-volt receivers, two VO batteries should be used, never three; for 4 1/2-volt receivers, three VO batteries.

Dry cells lose nearly 50% of their capacity at freezing and their internal resistance rises drastically. VO batteries lose a little punch at these lower temperatures, but not enough to be very noticeable. A trick will produce completely normal operation of the VO batteries down to -40°F. Before leaving the warm home, connect a bleeder resistor across the batteries and leave it there. The bleeder should be chosen to allow a continuous discharge of 4 ma. This drain is virtually nothing, yet the batteries won't feel the cold. For two VO batteries connected in series, the resistor should be about 650 ohms, 1/2 watt; and for four VO batteries connected in series, the resistor should be about 1300 ohms, 1/2 watt. Button cells should be

(Continued on page 50)

Fireboat

by WALTER MUSCIANO



Able to pump more water for their size than any other fireboat in the world, two of the mighty midjets are owned by the Port of Long Beach, Calif. Twin-screw, Aristo-craft motors.

For radio-control, it features two speeds forward, half-speed astern, proportional steering—and it pumps water! Two-channels ideal.



Action photo offers fine details of fittings, superstructure. Pump on model is electric driven steam engine used as a water pump. Won't put out any pier fires, exactly, but it's a dilly!

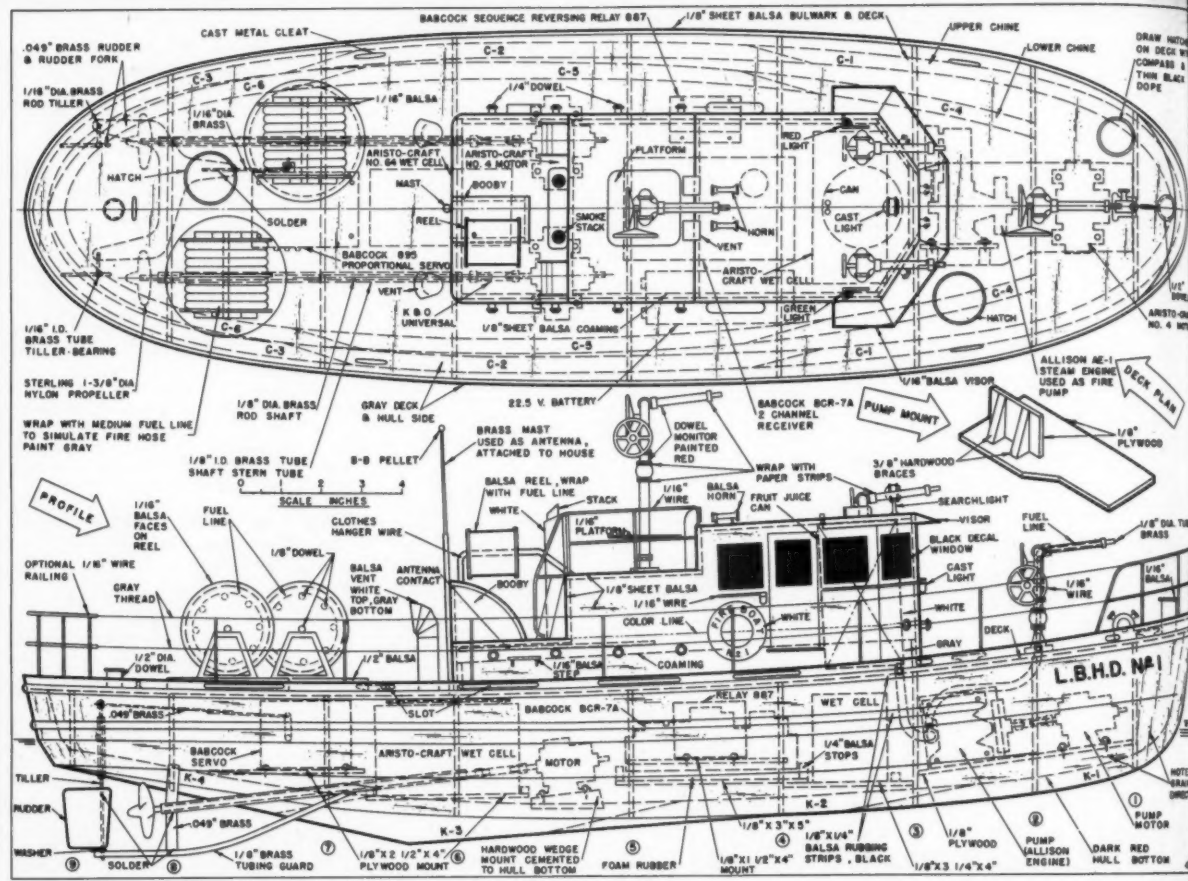
EDITOR'S NOTE—This is not a "paper project" as the lack of model pictures seemingly suggests. On a test run, before pictures were made (of course!) the propellers were fouled and the craft was swept over a dam, falling on rocks. Ironically, draft was greater than water depth over the dam lip, but. . . . The boat is (was) a beauty and we didn't have the heart to make Walt build a sistership. Scuttled also was the editor's dream of a lead pic of that monitor squirting water. It squirts, so help us!

This simple and attractive fireboat model offers exceptional building and operating pleasure as a reward for a minimum of effort and expense. Our boat features two speeds forward, half speed astern, plus proportional steering, and, as an extra feature it can pump water just like its full size brother!

Two fireboats of this design are owned by the Board of Harbor Commissioners and operated by the Port of Long Beach fire department. These craft are among the most efficient fireboats afloat. They are very small, about half the size of a conventional fireboat, but their pumping capacity of 4,500 gallons of water each minute enables them to pump more water for their size than any other fireboat in the world. Chemicals and foam are also carried as well as 2,000 feet of hose and the 12 fire hose connections plus the four turret monitors. A speed of 15 knots is attained with two diesel engines which also serve to power the large firepumps through clutches. Construction of these sea going fire engines is entirely of steel and they are designed to float very low in the water with little freeboard in order to be able to reach low fires under piers and docks, etc. In fact, Long Beach, Calif. has obtained two very efficient fireboats for the price of one "ordinary" fireboat.

The remote control operations of our fireboat are possible through the use of a Babcock BCT-7 two-channel transmitter in conjunction with a Babcock BCR-7A transistorized two-channel receiver. Proportional steering is achieved with a Babcock 895 proportional servo actuated by a Babcock 894 control box. Start, stop and speed selection, plus fire pump operation are by means of a Babcock 887 sequence reversing relay. There was no problem in fitting this equipment into the boat due to the compactness of the equipment and the spaciousness of the hull.

Each of the twin screws is propelled by an Aristo-craft No. 4 electric motor. Propellers are 1½" Sterling nylon type.
(Continued on next page)



In the model, the one working nozzle is mounted above tin-can water reservoir. Ample hull space.



Check this pic against drawing profile. Babcock proportional actuator, sequence reversing relay.

Steam engine an Allison, but many types available; drive, Aristo-craft No. 4 electric motor.

one left hand and one right hand, fitted on oppositely rotating shafts. This is optional and both can turn in the same direction if desired.

The selection of the fire pump was a problem until we considered using a steam engine for a reciprocating pump by merely attaching an electric motor to it. We used an Allison single-cylinder steam engine fitted with built in valves. There are many steam engines available which can be used as fire pumps. An Aristo-craft No. 4 electric motor drives the fire pump.

Electric power for propulsion, fire pump operation and other services is supplied by two Aristo-craft type 64, 6-volt wet cell batteries.

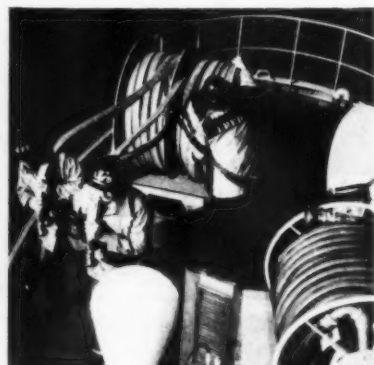
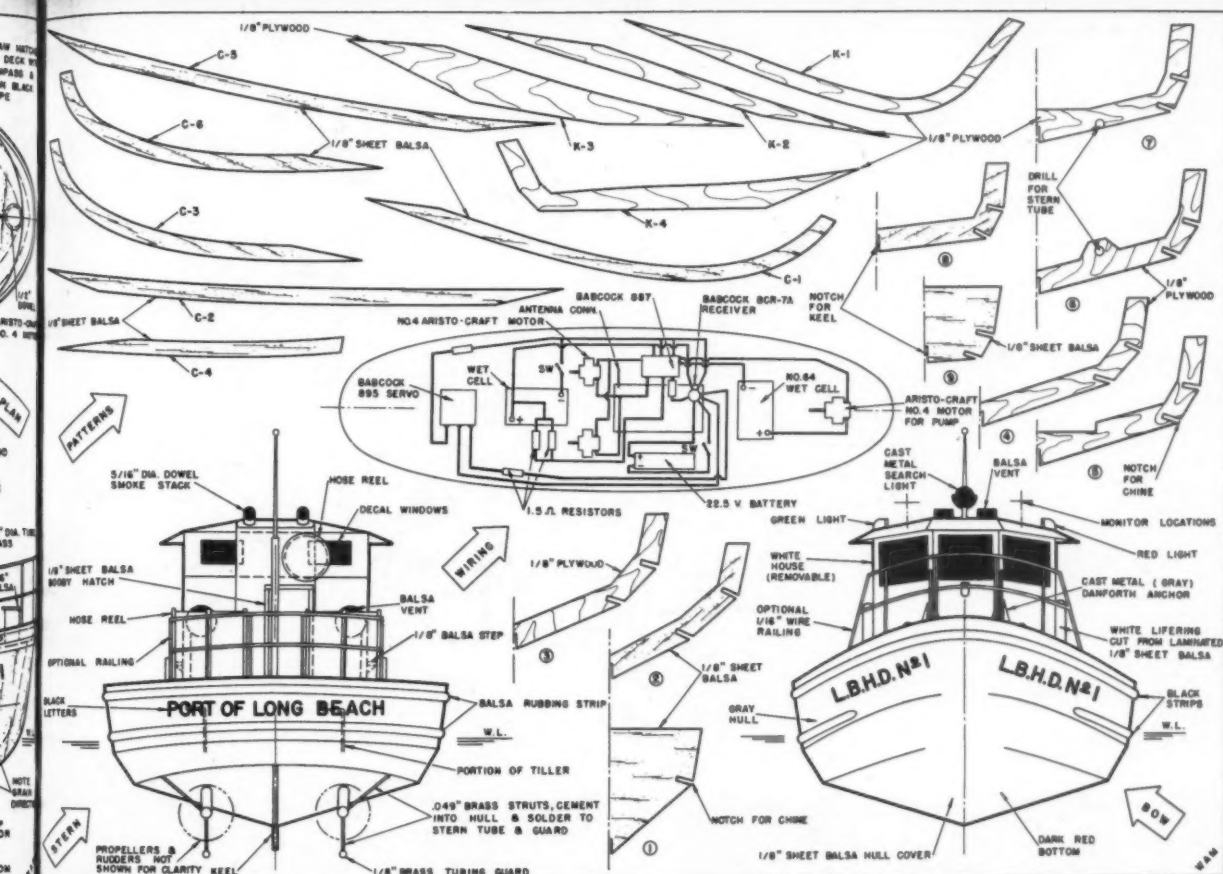
CONSTRUCTION

The keel which is traced onto plywood and cut to shape with a jig or coping saw. Cement the keel pieces together. While drying, the frames should be cut to shape and then cemented to the keel using plenty of the adhesive.

The main deck is cut from $\frac{1}{8}$ " sheet balsa with the grain running beamwise

from side to side. The 3" wide pieces of sheet balsa should be butt cemented to each other until the proper length of the deck is attained. Cut the deck to outline shape, including the cut out in way of the deck house, and cement the deck to the hull frames and to the keel at the bow and the stern. Cover the bottom of the hull with $\frac{1}{8}$ " sheet balsa and then install the propellers.

Cut the propeller shafts and stern tubes to length, being certain that the shafts fit snugly into the tubes with just enough clearance to rotate freely. Slip



Large fire hose reels built up from sheet balsa and dowel, wrapped with plastic tubing "hoses."



Model boat drawings can be Greek to the inexperienced, but details three-dimensional by

photo. Many deck fittings, bits, cleats, anchors, life preservers, etc., located in hobby shop.

the stern tubes through the holes in frames six and seven and through the bottom of the hull. Install the propellers onto the ends of the propeller shafts and slip this assembly into the stern tubes. When the shaft alignment is satisfactory, pour plenty of cement and "Plastic Wood" around the stern tube, on the inside of the hull, at the points where the tube passes through the hull bottom and the frames.

Cut the two rudder tiller bearings to length and cement in the hull in the proper location. Use plenty of bracing

to insure a secure installation. Bend the upper portions of the tillers and slip them through the bearings. Cut the rudders and rudder fork from sheet brass and file the rudders to a fairly streamline shape. Solder the rudders to the tillers, then solder a washer to the rudder bottom and top of the tiller. Solder a length of wire to the rudder fork to reach the servo and install the fork onto the top of the tiller. Solder another washer to the top of the tiller to retain the fork.

The inside of the hull bottom should

be given several applications of sealer to make it waterproof in case of seepage through the stern tubes. Install the plywood platforms for the batteries and receiver using plenty of cement.

Solder the electrical wires to the servo and then screw or bolt the servo to the plywood platform. Cement the servo platform in place in the hull after it has been connected to the rudder fork. Check the operation of the servo to be sure it operates perfectly. Attach the firepump and the electric motor to

(Continued on page 54)



Grand Champion (oh, no!) Woody Blanchard, third time. Mrs. B. and son, Slade, behind trophy. Tom Sutor, Contest Director, on R.



Eight trophies, \$1000 scholarship, Bob Sifleet, Sr. Champ. As Miss Miami Model Aviation 15-year-old, gracious Sharon Zimmerman.

Junior Champ, David Edmonson, from Minneapolis. Sifleet hailed from Toledo, Blanchard from Virginia. Nats records broken, too.



King Orange

Bowl game madness is on the land when the modelers trek to a classic festival of their own, the year-end open house at Miami. Bigger meets, smoother meets, yes, but this one really is out there!

► Among major contests, none is more unique than the Annual King Orange Internationals, held yearly between Christmas and New Years (December 27-30 in 1958), at Miami, Fla. Shirt-sleeve flying in that Floridly sunshine is a potent attraction to frostbitten northerners, from Iowa east to New York. King Orange is a special kind of meet. It is ambitious, offering a wide array of events and, this year, even included scholarships, prizes and a Teen-Age Rocket Exposition. Informal, breathless, and, until it's over there's a feeling of golly, will we make it? But the modelers go home happy.

Anything can happen, and usually does. In an evening fly-off, eight ships thundered aloft together and all snagged thermals. The first crate down was given second place, but Ralph Miller refused the trophy, ended up with the trophy anyway—and the Best Sportsmanship award! The rocket exposition flopped (four entries) but a going rocketry club was formed afterwards. CD, Tom Sutor, a National Airlines captain, was called to duty on the climactic day, hurried back that night to be told by the Mrs. that he hadn't been needed. Nobody qualified for the scholarship to be awarded locally but some guy had a string of wins as long as your arm—he didn't register for it! Bob Sifleet, Toledo, took eight trophies back to Ohio and a \$1,000 scholarship.

Some birdbrain questioned the solvency of the meet, booby trapped the scholarship deal—but now everybody is happy. Even though the modelers take it all in stride and pronounce it fun, things will be different next year, 'tis said. Sponsor of the sixth annual King Orange will be the Air Training Corps, a full-scale flying club in Miami. And the parking lot will be filled with out-of-state plates—unquestionably. December 26-through 31—bring your beach umbrella!



Let these winter winds howl! Carl Miller, from Nashville, shields eyes from sun to keep RC in view, while judges frantically go about, ah, judging. Points were low—boys must have worked.



Most interesting RC, engine on strut, by native Dick Alexandria, Indian Rocks, Fla. Functional.



Air mattress, umbrella and Sunday papers help Mr. and Mrs. Owen Wysong, Madison, Wis.,

keep up with competition. Beats standing up any day. Easy seeing why contestants pleased.



Science rears its ugly head. High thrust, engine on strut, tip plates, feature Ralph Knight ship.



Perennial contestant in RC, Art Christen, from Toledo, O. Nifty Astro Hog took multi second.

Below—Glistening Black Widow (only second!), by Carl Roesler, Cleveland, O., in Senior Scale.



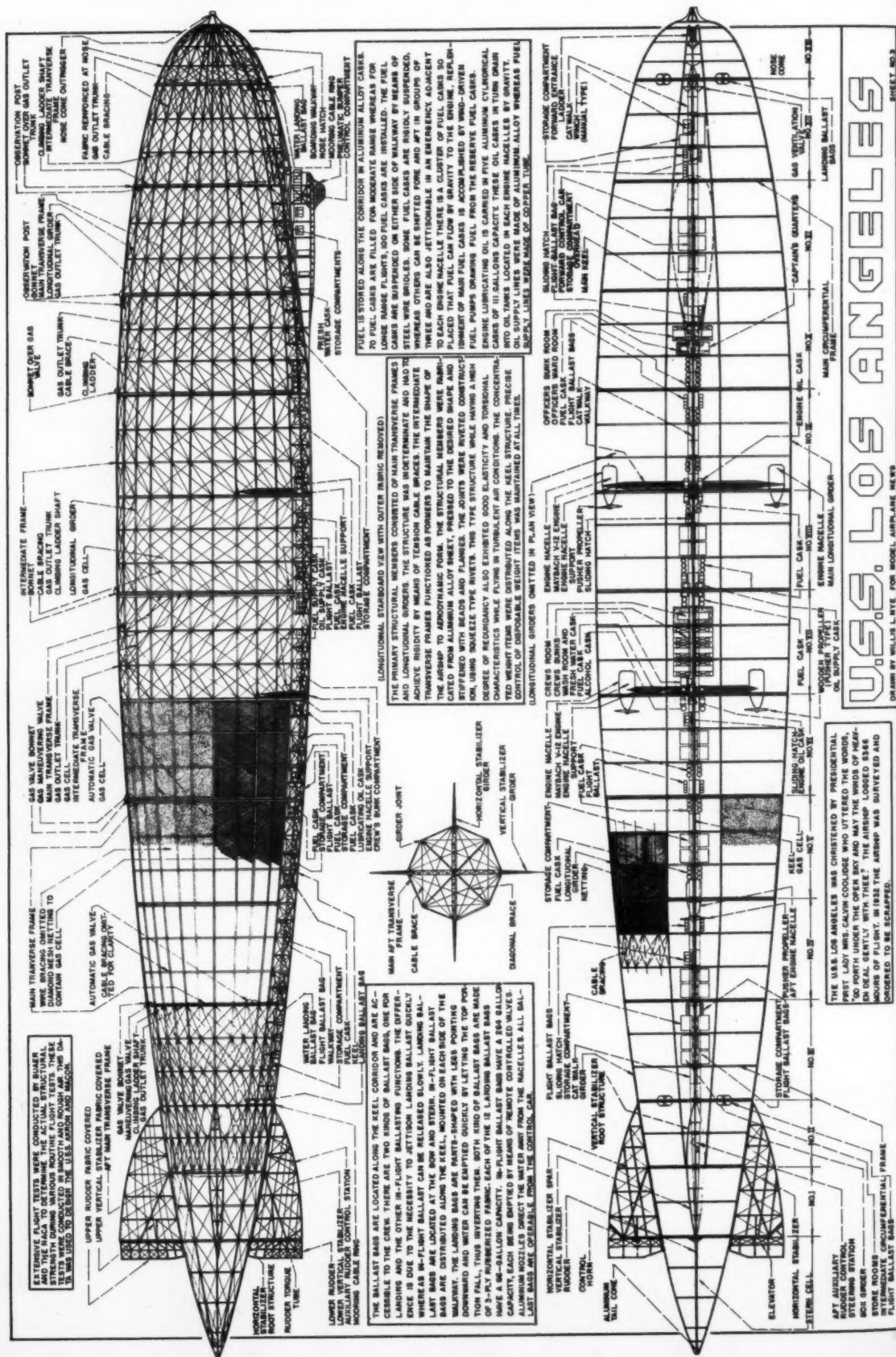
Two Florida boys, Bob Schuettler, L. Pete Taylor, Lake Worth, start up Half A Orbit, a MAN ukie.

Fierce Arrow (from MAN plans) was flown by Robert Lentz, Opa Locka, Fla. Chet Miller pix.



Bill Woehler, Orlando, Mrs. checking motor run with watch—the Free Flight Champ. A Spacer. Zekelike free flight was handled by Bob Siffert with telling results. Sure looks like a howler!





THE MAIN CONTROL CAR NAVIGATION COMPANY MEANT CONTAINED THE FOLLOWING AIRCRAFT INSTRUMENTS:

- BAROGRAPH
- SMOOTHER FORCE INDICATOR.
- OUTER AIR THERMOMETER.
- BAROMETRO BAROMETER.(THREE)
- CHRONOMETER.
- STOP WATCH.
- INCLINOMETER
- SYNOPSISIC INCLINOMETER.
- GAS THERMOMETER.
- MAGNETIC COMPASS.
- SYN COMPASS.
- AIR SPEED INDICATOR.
- DRIFT INDICATOR.

FLIGHT CONTROLS
ELEVATOR DEFLECTION INDICATOR.
ELEVATOR CONTROL WHEEL.
BALLAST WEIGHT INDICATOR.
RUDDER CONTROL WHEEL.
RUDDER DEFLECTION INDICATOR.
BALLAST CONTROLS.
GAS INFLATION CONTROLS.
MOORING MAST ROPE RELEASE.
LANDING ROPE RELEASE.
SIGNAL BELL.
ENGINE TELEGRAPH (S)
SEARCHLIGHT WITH SHUTTERS.
ELECTRICAL SWITCH BOARD.
ELECTRICAL LIGHT CONTROLS.
RUNNING LIGHT CONTROLS.
VARIOMETER.

WATER TEMPERATURE INDICATOR
LUBRICATING OIL PRESSURE INDICATOR
FUEL PRESSURE INDICATOR
ENGINE R.P.M. INDICATOR
OIL TEMPERATURE INDICATOR

THE ENGINE NACELLES WERE COVERED WITH DURALUMIN SHEET. THE PANELS WERE REMOVABLE FOR ACCESS TO THE ENGINE INSTALLATION. ENGINE NACELLES PRIMARY STRUCTURE CONSISTED OF A DURALUMIN SPACE FRAMEWORK STRUCTURE.

Diagram illustrating the internal components of a ship's hull, including the flywheel, bearings, lubrication oil tank, and piping.

Technical drawing of a cable bridge detail. The drawing includes a cross-section view of the cable horn and a side elevation view of the bridge structure. The cross-section shows a triangular cable horn with a width of 1/2 inch. The side elevation shows a bridge structure with a width of 1/2 inch and a height of 1/2 inch. Labels include: CONTROL CABLE HORN, DURALUMIN CHANNEL EDGE, FABRIC COVERING, DURALUMIN RIB, 1/2 inch, DURALUMIN SPAR, CABLE BRACE, RIVETED JOINTS, and UPPER AND LOWER BRIDGE DETAIL.

THE MAIN CONTROL CAR WAS
A RIVETED JOINT SPACE
FRAMEWORK STRUCTURE
MADE OF DURALUMIN STRUTS
AND BUILT UP TRUSS MEM-
BERS.

NAME COVERING ON AT
END OF CONTROL CAR

END POST
MAIN LOW
CABLE S
STRUT
CONSTRUCT
ENTRANCE

Technical drawing of a car chassis showing various components and dimensions. The drawing includes labels for the following parts:

- SLIDING DOOR IN ENVELOPE
- STRUT
- COMPRESSION AIR FLASK
- LATTICE
- RADIATOR
- AIR FILTER SCREEN
- 7-7"
- EXHAUST GAS COUPLER
- EXHAUST MANIFOLD
- WINDOR PIPE
- WINDOR
- 3. RECELLS

GAS CAPACITY WAS 2,472.000 CUBIC FEET. LENGTH WITHOUT MOORING WAS 162 FEET. GREATEST DIAMETER IS 30.68 FEET. DIAMETER AT THE HULL IS 30 FEET. DIAMETER AT THE MAST IS 30.68 FEET. GREATEST HEIGHT INCLUDING PNEUMATIC BUMPER WAS 60.71 FEET. WEIGHTS WERE EQUAL TO 31,000 POUNDS. NON-DEFORMABLE WEIGHTS WERE EQUAL TO 35,000 POUNDS. THE ENGINES WERE IN VERNON FOUR-CYCLE REVERSIBLE WATER-COOLED, 400 HP AT 1400 RPM, VEE TYPE 15 CYLINDERS. REVERSING OF THE ENGINES WAS ACCOMPLISHED BY SHIFTING THE CARBURETOR WHICH BROUGHT A DIFFERENT SET OF CAMS TO OPERATE THE VALVES INTO OPERATION. THE ENGINE WEIGHT WAS 1100 LBS. FUEL CONSUMPTION AT 1400 RPM WAS 45.18 GAL PER HOUR. OIL CONSUMPTION AT 1400 RPM WAS 1.5 GAL PER HOUR. THE ENGINES HAD TWO IN CYLINDER REVERSIBLE MAINTENANCE DISCHARGE VALVES 2.055 CUBIC INCHES.

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1. MAIN CONTROL CAR FRAME
2. STRINGER
3. GIRDERS

THE WATER RECOVERY SYSTEM... BY THE U.S. NAVY, IF ONE GALLON OF HELIUM WERE USED TO PRODUCE ONE GALLON OF FUEL, WOULD 1,000 GALLONS OF WATER BE PRODUCED. IT IS NECESSARY TO VALVE DOWN THE WATER TO MAINTAIN LONGITUDINAL TENSION.

ENGINE

NACELLE

ORAIN

RECOVERY INSTALLATION
(SCHEMATIC DIAGRAM)

ENGINES WERE STARTED BY
COMPRESSED AIR AND FUEL
INJECTION.

U

The control, CAR CONTAINS ALL NECESSARY EQUIPMENT FOR COMMUNICATION OF THE AIRSHIP A STAIRWAY LEADS FROM THE CONTROL, CAR TO THE CORRIDOR AND CAT WALKS ALONG THE KEEL STRUCTURE. THE WHEEL CONTROL FOR DIRECTIONAL CONTROL IS SEPARATE FROM THE WHEEL CONTROL FOR ATTITUDE. THE WHEELS OF THE CONTROL CAR, THE ELEVATOR WHEEL, CAR, AND BALLAST WHEELS ARE LOCATED ON THE KEEL. THE INSTRUMENTS SHOWS ALTITUDE, VERTICAL VELOCITY, THE PITCH OF THE AIRSHIP, CAR AND EXTERIOR AIRSHIP. TEMPERATURE INDICATORS ARE LOCATED ON THE PORT SIDE OF THE CONTROL CAR. THE ENGINE TEMPERATURES AND THE TELEPHONE CENTRAL STATION ARE LOCATED ON THE PORT SIDE OF THE CONTROL CAR. TWO CREW MEMBERS OPERATED THE CONTROLS UNDER THE DIRECTION OF THE EXECUTIVE OFFICER, NAVIGATOR OFFICER AND CAPTAIN.

STIFFENING BEAM

SIDE CHORD MEMBERS

DETAIL OF GIRDERS

ATTACHMENT LUG

NAVIGATION COMPARTMENT

ALL OTHER MEMBERS

COMBUSTIBLE ALUMINUM
 FLOOR WITH LINDOLIN
 COATING

MAIN CONTROL C.
 STATION

ENGINE, METALLIC
 SUPPORT STRUT

TRANSVERSE
 GUY
 WIRING

LONGERONS

TRANSVERSE
 BRIDGES

PYLON

1
 2
 3

Diagram illustrating the cable joint construction. The drawing shows a cable being joined to a cable brace. A riveted joint is shown in cross-section, with labels for 'CABLE', 'CABLE BRACE', 'RIVETED JOINT CONSTRUCTION', and 'ORDER'. A section line 'A-A' is indicated. Below the diagram, a text box contains the following information:

WAS DEVELOPED AND INSTALLED
 OF PULS. WEIGHTS 500 POUNDS, 1000
 60 POUNDS OR 10 GALLONS OF
 ARE BURNED (6,000 LBS.) IT
 FEET OF HELIUM IN ORDER TO
 ALTITUDE. THE INSTALLA-

THE
WAVE HELIX, THE WATER RECORD-
ING FUEL THAT WAS BURNED. ALL NAV-
Y-OPERATED.

Technical drawing of the nose section of the Space Shuttle Challenger. The drawing shows a cross-section of the nose with various structural components labeled. Key dimensions include a total height of 15'-0" and a width of 14'-0". The structure is composed of a durallumin spar, fabric covering, durallumin trussing, riveted joints, cable brace, and right and left elements. The aerodynamic balance is also indicated.

SHUTTER

MANFOLD

STEEL STUD

FABRIC ENVELOPE

WOODS PUMPER PROPELLER

SUSPENSION CABLE

FIBER OPTIC CABLE

WATER CASK

ADJUSTER CLEAT

ALUMINUM CASK

ENGINE EXHAUST

GAS MANFOLD

AFT END OF

RACELLE WAS

OPEN

NAGELES

WATER RECOVERY INSTALLATION

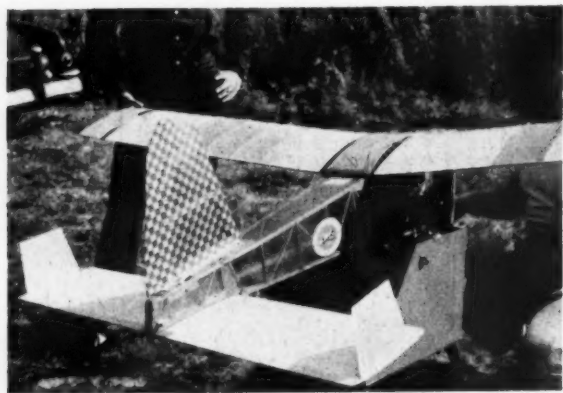
SHEET NO. 4

SEEKING FOR SENSE

SAVED BY WELLS: MYE FOR MODEL AIRPLANE MEWS



On .09 Diesel this big ship got off in wind after 110 feet. Soars fully loaded, would climb empty on low motor. How keep down?



Directional stability tough at low speeds, so early, ill-fated ship jammed on extra fins. On paper, 13 hours, piloting too tough.

Say duration, and you think of special engines, tank, batteries, radio, aircraft. But how do you hold on a wing all day? Or keep the escapement rubber from snapping? The little things are rough!

► In the preceding three articles it was demonstrated that an all-day endurance flight is feasible with an RC model. Test models took off successfully with fuel and batteries of a 13-hour capability. Late in 1958, two record tries came to grief, both because of the human factor.

A third airplane has since been built and a fourth is in process of construction. No. 3 is identical to the three-view given in the first article. No. 4 has the vertical tail moved back eight inches, the stabilizer four inches. The nose is two inches longer. Now, let's consider the problems that face super-duration fliers.

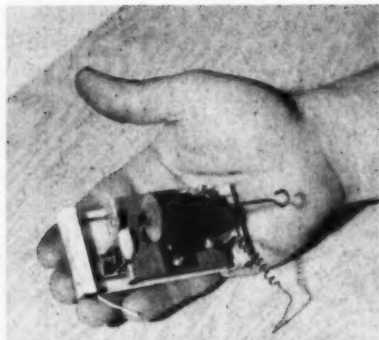
Actuator: Equipmentwise, the big problem is the simple matter of how you operate the rudder.

Escapements were used on the first two airplanes. Escapements mean rubber. A count of control impulses indicate that an expert flier will average about five control applications a minute, sometimes less as the plane circles, and sometimes more. The safe minimum is six. This means 360 an hour, 3,600 for 10 hours, or 4,680 for 13 hours. So 6000 control applications allowed for will barely give an assurance of success despite wind and emergencies. A compound escapement uses one rubber turn per rudder use.

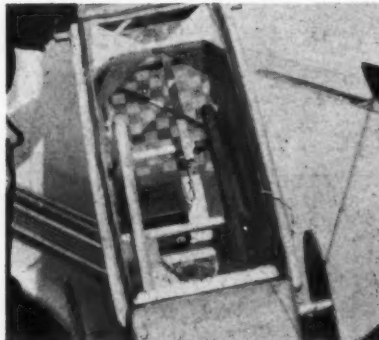
On big, loggy airplanes with large rudder area (even balanced) the minimum rubber that can be used safely is 3/16, and this leaves many unusable turns. Six-thousand turns means two motors, geared, of five-foot length. Stretch winding is required. Tightly wound rubber easily may snap when left for hours in the heat, especially when sunlight can filter through covering-colored dope adds weight. Unless wound in the cool morning, you simply cannot reach capacity without breakage. Indoor tests held turns for over 30 days; outdoors, rubber could snap when two-thirds wound.

A rubber rewind device is one solution. With one long rubber motor, with the winder in the very nose, the winder would put on sufficient turns to fly, without exceeding a row of knots. This winder was (Continued on page 46)

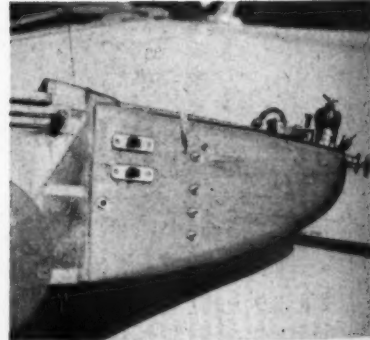
...DAWN TO DUSK...



Rubber required 6000 turns. Rewind device looked like solution but even here lessons learned.



Compound servo eliminates rubber but hours of flying without timing mistake builds up tension.



Good tip for chargeable batteries, external top which allow charging nightly, equipment in ship.

TOP FLITE

GAS KITS TOP THEM ALL!

Three terrific planes designed by George Aldrich, America's greatest stunt champion!



THESE 1/2-A MODELS SWITCH FROM CONTROL LINE TO FREE FLIGHT & BACK AGAIN IN A JIFFY!

Each kit contains: formed landing gear, push rod, elevator horn, wheels, bell crank, firewall, decals, and all necessary hardware. All parts are completely finished. Only select Grade-A balsa is used. Full size detailed plans with many step-by-step construction features making it easy to build and fly.

Ideal for beginners... and experts, too! All feature **POWER JIGTIME CONSTRUCTION** for easy, no-mistake assembly!



PIPER CUB

27 inch wingspan. This 1/2A scale flying model is so realistic that only the size makes it a model instead of the real thing! Includes formed plastic cowling, die cut clear plastic windshield.

Kit No. 3-B
\$2.50



RASCAL 27

27 inch wingspan. An outstanding favorite with all 1/2A model builders for years! Includes die cut clear plastic windshield.

Kit No. 6-B
\$1.95



ARROWJET 24

24 inch wingspan. Has the dash and class of modern Navy prop-jet design. Ideal for 1/2A gas engines. Includes formed clear plastic canopy.

Kit No. 9-7
\$2.50

Ask your dealer for a
FREE Top Flite
PROP CHART

the NOBLER CHAMPIONSHIP CONTROL LINE



STUNT SHIP

Kit No. N-1

\$8.95

Wing Area 550 sq. in.
Wing Span 50"
Length 38 1/2"
Eng. Sizes .19 to .35

THE "WINNINGEST" STUNT MODEL EVER FLOWN... Won More Nationals and International Stunt Championships Than Any Other Model!

these CONTROL LINE COMBAT and STUNT TRAINERS are among America's greatest... two of the most successful planes ever designed!

Kit No. N-2

FLITE STREAK \$3.95

FLASH!

1958 NATIONALS
WINNER OF BOTH
Senior and Junior
COMBAT



Engine sizes .15 to .35
Wing Span 42"
Wing Area 390 sq. in.
Length 28"

BOTH OF THESE KITS CONTAIN:

- Full length shaped and notched landing and trailing edges and spars.
- Shaped fuselage.
- Select grade A balsa.
- Printed and precision die-cut balsa and plywood parts.
- Formed landing gear and push rod.
- High grade silkspan.
- Hardwood engine mounts.
- Complete detailed plans with many step-by-step construction features making it easy to build and fly.

HERE'S WHY THEY'RE SUPERIOR MODELS:

1. Full length landing, trailing edges and spars. Require NO SPLICING, an exclusive feature for this size and type of model.
2. Assembly is easier, faster — with perfect alignment.
3. This Jigtime construction of notched spars, landing and trailing edges allows you to construct a symmetrical wing on a flat surface without special jigs, also making it warp resistant.



JR. FLITE STREAK

Kit No. N-3

\$2.95

Engine Sizes .15 to .25
Wing Span 31"
Wing Area 230 sq. in.
Length 22"

by the makers of famous TOP FLITES and POWER PROPS... the Props of Champions
AVAILABLE AT ALL LEADING HOBBY SHOPS

TOP FLITE MODELS, INC., 2635 S. Wabash Avenue, Chicago 16, Illinois

TOP FLITE



Demonstrating fibre glass application on Live Wire during Flying Bisons club meeting is Vince

Rasp. Just glass cloth, brush, and paper cup of mixed resin, that's all. Makes front end tough.



A sterling Sterling Monocoupe on pontoons, the work of John Wick, Fillmore, N.Y. A Torp .29.

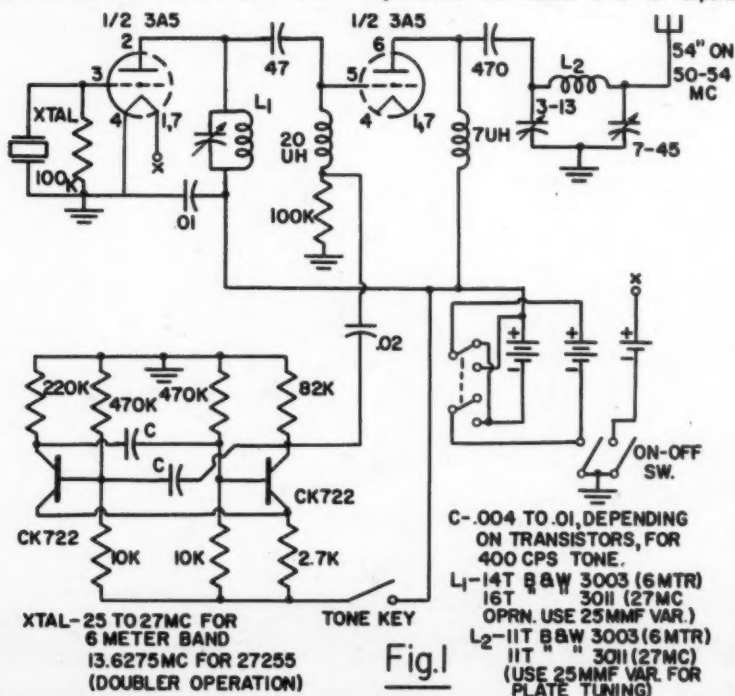
radio control news

Club News • New Items • the Kraft transmitter • Technical Notes • Monitor for transmitters • Hints and Tips • Ideas

by EDWARD J. LORENZ

KRAFT TRANSMITTER. Last month information was given on the Kraft receiver. Below is the

schematic for the Kraft transmitter. Test checking showed fine results. It is for experts.



Although over by now, the Flying Bisons of Buffalo, N.Y. held an RC get-together during a time when flying was a little out of the question due to snow and cold weather. However, the program showed that much benefit could be derived even with no flying scheduled. They planned a swapfest where anyone could trade or sell their extra parts, engines ect. Talks were to be given by Bill Winter on RC duration flying, Ernie Kratzet on contest flying, Hal deBolt on aerodynamics, Dick Branstner on radios, Maynard Hill on proportional actuators and Pete Bliss on servos. In addition, there was to be a real old fashioned gabfest on construction, installations and general design.

Should be some snappy pylon racer designs coming out of the Oakland, Calif. area since the EBRC Carrier has offered the club members an award for the best design. The Simpl-Simul system is making good headway in that area as is the Breezy Jr. flown by Bob Forbes. Breezy and Bob fly when it's too windy for anyone else. Proportional control is the only way to really get that much needed trim for decent windy weather flying. Beginning on January 1st, the EBRC club will adopt a point system to determine the year's most active members. Prizes will be awarded in December of this year to the top 10 fliers, plus a free air trip to the NATS, to be awarded on July 1st. Points are: Entering or flying in an EBRC club or Open contest two pts.; placing 1st, 2nd or 3rd in above, four pts.; winning a club award in design, crackup, etc., five pts.; building and flying a new RC

(Continued on page 35)



Thimble-Drome

World's Foremost Name in Model Engines

ANNOUNCES

TWO TERRIFIC 15's

FOR ADVANCED SPORT AND CONTEST FLYING

15 Series

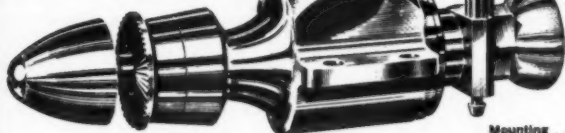
FEATURES

- Integral Glow Head with Spherical Combustion Chamber
- Hardened and Ground Counter-Balanced Crankshaft
- Reed Valving
- Triple Periphery Jets
- Rear Carburetion
- Ball and Socket Piston and Rod Assembly

Produced by Exclusive Thimble-Drome TEM-ROL Process—Accuracy within Millionths of an Inch

Olympic .15

BALL BEARING CRANKSHAFT

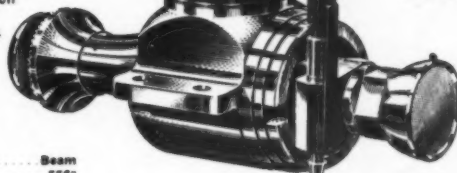


A super hot contest engine, surpassing engines of much greater cu. in. displacement in power, performance, and endurance. Extra precise fitting of piston and cylinder to top contest requirements.

Recommended for F.A.I. free flight, and speed

1298

Sportsman .15



Just what the name implies. A dependable engine that delivers smooth performance in both 4-cycle or 2-cycle operation. Entire crankcase made of a super bearing-alloy which assures lasting bearing life.

Recommended for control line, radio control, and scale free flight

798

L. M. COX
MANUFACTURING CO., INC.
Santa Ana, California

Send for folder M, "How to Get the Best Performance from Your Engine." Informative, valuable.

NEW! TERRIFIC!

Toshi Matsuda's

ZERO

1/2A FREE-FLIGHTER THAT DOES IT WHEN OTHERS FLOP!



\$2.95

The hottest thing in 1/2A! It climbs higher, faster... stays up longer. Designed to use ALL the power of the best .049s! For an unsurpassed thrill, hang your engine on a ZERO. See for yourself the super performance that has already won a string of Firsts! At a recent contest the "anyone can get 5 minutes" models were doing 3 to 3 1/2 minutes. Tosh dethermalized his ZERO three times straight at over SEVEN MINUTES. Does that tell the story?

WARNING! Watch the engine-run—or you may put your ZERO in orbit!

FREE FLIGHT DELTA



for .049 Just \$2.50

It doesn't take a hot shot to build and fly this Delta, although a lot of hot shots are flying them in order to be putting something different in the air. If you too are curious about a Delta, here's dependable performance and true Delta characteristics in a job that has been thoroughly proven before being announced.

THE ALL-TIME FAVORITE GOES RADIO CONTROL



MISS TINY \$5.95

Exceptional wind penetration and stability!

A good flying R/C Model doesn't have to be an ugly box! Miss Tiny is world-famous for her beauty and flying qualities. Uses hot .049 to .099 engines, depending on weight of R/C gear. Wing Span 46". Finished cowl and die-cut parts.

Ask your Dealer, or send M.O. and we'll ship prepaid. (Mr. Dealer: If your jobber won't supply you, send M.O. for prepaid shipment, regular discounts.)

MODEL CRAFT

8945 SOUTH WESTERN AVENUE
LOS ANGELES 47, CALIFORNIA

Foreign Notes

(Continued from page 2)

for overtaking is set at 6 metres (19 ft. 8 ins.). Lines must be fixed to the axis of the handle.

For Radio-Control, a new set of rules, based on a mixture of American and British contest rules, has been agreed and will be published in detail in due course. Maximum surface loading is now increased to 75 grammes per square decimetre—i.e. 24.58 oz./sq.ft. For Distance records, it is confirmed that models may be followed by any means of transportation and a new Closed Circuit record class, with a 500 metre baseline, has been introduced.

In Free-Flight Power Contests, the maximum time for an "attempt" is now increased from 15 to 20 seconds, thus bringing gas rules in line with those for Wakefield and A.2.

GREAT BRITAIN

How long should a Records List stand? Should records be permanent, irrespective of model rule changes? This is one of the questions that confront Britain's SMAE, which is now considering scrapping the existing records and instituting a new list with revised classes. Many of the present British record classifications date back to pre-war days and some of the records still standing, are not much younger. Of nearly 50 existing outdoor records, only 19 have been established during the past five years. No less than 12 records were set up before 1950 and one, for rubber-driven "Rotor-planes" (autogiro) goes back to March 1936. Incidentally, the British rubber Helicopter record is still held by Jimmy Tangney of the U.S.A.—2 mins. 44 sec., set up in 1950 when he was stationed in England with the U.S. Navy.

Due for first deliveries about the time these words appear in print, is a new large Frog Diesel, the '349'. This motor, a prototype of which we tested more than a year ago, is an out-of-the-rut design that has been specially developed to meet the needs of combat and R/C models. It has a bore and stroke of .666 x .600 in., giving a displacement of .21 cu. in. or 3.47 c.c., and features rear induction, via a unique type of shaft or drum type rotary valve, with steeply raked intake to cut down bearer overhang. Cylinder porting, unusual in a Diesel, is of the loop-scavenged type and there is an extended exhaust stack to facilitate the fitting of an exhaust throttle system. The engine is very rugged and has its crankshaft carried in a single inner ball-race, supplemented by a plain outer bearing. It weighs just over 6 oz.

JAPAN

Several different types of O.S. radio-control sets, ranging from one to six channels, have been manufactured during the past four years. Now about to go into production are two entirely new multi-channel, fully transistorized, reed outfits: one five-channel and one eight-channel. Transmitter for the latter has a stick control.

The new type O.S. Max-II 29 engine, which is similar to the 35 model already described in these columns, is now available. Like the 35, it has a re-balanced shaft of exceptional size (over 1/2-in. dia.) and revised intake timing.

The latest from the Enya Company is the Enya O6, a new small engine aimed mainly at the beginners' market in Japan. Designed by Yoshino Enya, youngest of the three Enya brothers, the O6 is in marked contrast to all other engines in the present Enya range. Having a faintly "Coxish" appearance, it has a reverse-flow scavenged cylinder, reed valve induction and a coil-spring "starter" around the bearing-housing. Basically a beam-mount motor, it is easily converted to radial mounting by

means of a neatly pressed alloy bell-housing supplied, which provides rigid four-point attachment. The motor has a bore and stroke of .437 x .4055 in. and weighs a fraction over 2 oz. It is neatly packaged in a plastic molded container complete with combination wrench.

CZECHOSLOVAKIA

As reported earlier, Czech speed fliers, always to the fore in International speed events, have lately adopted delta-wing configurations, and drawings of Koci's and Pastyrik's models (3rd and 4th at the Brussels Internats) have now been published in Czechoslovakia. Except for planform shape, models are very similar. Pastyrik uses a simple delta shape with 60 degrees sweep-back; Koci has a double-delta planform with 65 degrees for half the semi-span and 25 degrees for the outer section. Both models use small end-plates, those on Koci's model being extended forward, so that the left-hand one can serve as a line guide. Total surface areas are 79 and 80 sq. in. respectively, spans being 11.2 and 13 in. Both models are just under 13 in. in length and use special MVVS 1958-type 2.5 c.c. racing glow motors driving 5.8 and 5.9 in. dia. props. Cowlings are conventional and expose the head fins.

IN BRIEF...

Hungary... Unique new "Seal Baby".00 marine motor from Hungary has a built-in 4:1 reduction gear.

Australia... In many Australian team-races, a 44-gallon steel drum is now being used as a pylon, making pilots walk around it. This also increases effective radius, of course.

France... Micron, famous Paris model engine manufacturers, are now also making miniature electric motors, suitable for RC actuators, etc.

MAN at Work

(Continued from page 4)

gestions, (here boiled down) that the actual voting results be printed, that the results be abided by or that we continue under the old rules, that the Contest Board submit proposed changes to model publications so that a sample ballot be taken to determine the wishes of the majority, that membership of AMA have problems made known to them so that they fully understand necessary rules change proposals; and, finally, that the Contest Board, abide by a two-thirds popular vote, on any issue, unless total votes on that issue are less than 5% of AMA membership which would nullify the vote and require a new vote.

The Hunter protest, surprisingly, in view of wild rumor, does not claim that the membership of AMA was not given the right to vote. We say surprisingly, because the most inflammatory issue is just that—the membership, say the most expressive Californians (letters on file), did not vote.

F. L. Swaney, Swaney's Hobby House, Long Beach, Calif. in a long letter said, "I was shocked beyond words, not because of the changes made in the old rules (underscore that last clause—Editor) but in the 'unconstitutional' method used to cram them down our throats."

From Sal Taibi, "I guess (underscore that last word—Editor) you and Hatschek have done your bit to ram the FAI rules down the throat of the American modeler whether they voted for it or not."

From W. W. Gregory, "... underhanded way in which new rules were railroaded through by one member (who incidentally does not fly free flight but only rubber) and his followers who number a very selected minority, was unconstitutional and ridiculous." The CB chairman

is an ardent free flyer, by the way! From Jim McGee, Clinton, Ohio, "...with the various clubs and individuals writing to each other, we are convinced that in no way possible could the majority want these new rules. It is hard to believe that the sole organization on which all of us depend could fall into line with such a small minority." And so it goes.

► Now, first, did the AMA membership vote?

In the October issue of Model Aviation, the Academy of Model Aeronautics news monthly pamphlet, a questionnaire was included, to be filled out by the membership, giving their yes or no and/or their preferences on rules proposals. On November 7 last, October MA was mailed to 22,035 members. December 1 was the stated deadline for questionnaires to be in the hands of Contest Board members, and December 7, the deadline for the CB members to turn into Chairman Hatschek their tabulations. December 14, the Chairman was to report to Washington, in person, with this information, which was then gone over by Wheeley, Nichols, and Dr. Good as well.

MAN at Work has obtained a duplicate of headquarters records. Only 1,257 members bothered to "vote." Thus only .057 percent of the membership filled in the questionnaires, by which we all have to fly! The maximum expression on any one point was less than 3% of the membership (with such apathy it would not be practical to require a vote of more than 5% on any point, as Hunter suggests—unfortunately.) Roughly, 94% of the membership is too bored to bother!

Did the voting membership realize this was a ballot? Actually, this is the third time, about the same procedure, has been used. The last two rules changes (four years) were made in this manner. The procedure was established when it became possible to mail Model Aviation to all members. Prior to that, only Leader Members were polled and, before that, the Contest Board members made and revised rules without any mail poll. It would appear that precedent at least establishes the questionnaire as a ballot.

Third big question: Was the popular vote subverted? To answer, we must establish what the popular vote was, what the Contest Board membership vote was, then check one against the other.

Each year, AMA officials appoint a Nominating Committee with members in each of the AMA 11 districts. Names are proposed for national offices and, in the case of the Contest Board, each district Nominating Committee man supplies four candidates. A membership vote selects two out of the four Board members for each district.

The president of the AMA appoints a select list of Advisory Committee members who work far in advance of any rules voting, to provide guidance on the matters that should be incorporated into the questionnaire, later included in Model Aviation, and mailed to all membership at large. The formation of the questionnaire is determined by these recommendations plus those of the Contest Board members.

Under the present setup, the popular "vote" does not necessarily determine the rules. The Contest Board does the actual voting, guided by the popular voting, but with legal right to disagree with that vote if necessary. We don't argue pro or con. This is the existing system; it has not provoked a challenge until now. Hatschek certainly did not create it, Hunter to the contrary.

(Continued on page 38)

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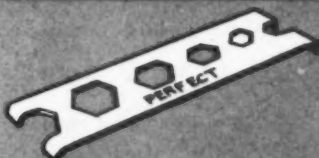
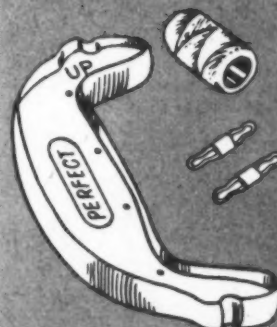
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Engine No.	Size
"19"	"42"
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"35"	"75"

OR

Engines



MCCOY
"19"
\$7⁹⁵



MCCOY
"29"
\$9⁹⁵



MCCOY
"35"
\$11⁹⁵

Engine No.	Stroke	Displacement	Weight	H.P. Rating
"19" 42"	0.617"	0.19 cu. in.	6.0 ounces	0.40 at 13,000
"29" 32"	0.712"	0.290 cu. in.	7.0 ounces	0.54 at 12,500
"35" 75"	0.740"	0.350 cu. in.	7.0 ounces	0.60 at 12,500

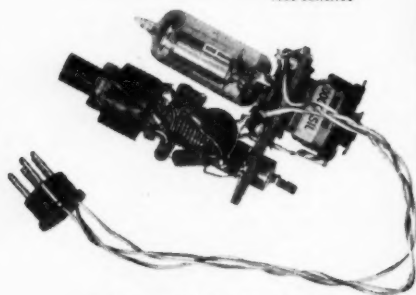
...radio control

Berkeley's Crystal Controlled MARK "IV" "AEROTROL" TRANSMITTER and RECEIVER

Radio Control 27.255mc.

New plug in receiver of exceptional
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Quality design and reliability.

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DE-401 "MARK IV" AERO Assem. Rec. & Trans Comb. \$24.95
Ready to use - less batteries Free Escapement Included!

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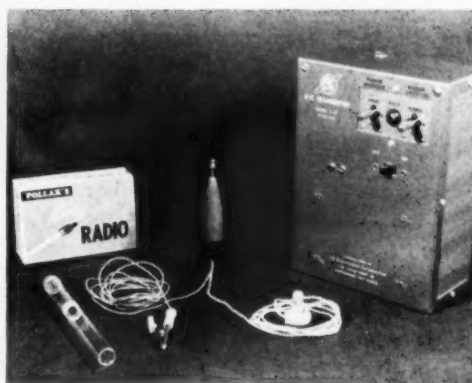
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receivers; relays; actuators;
installation and flying.

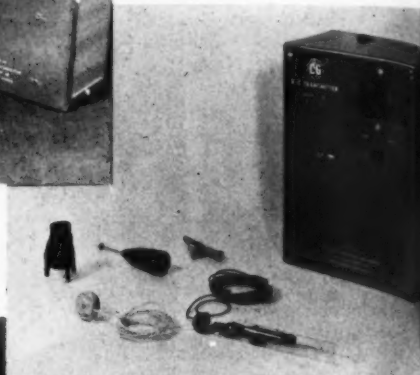
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Left—Items required for transmitter
monitor that is described in text.

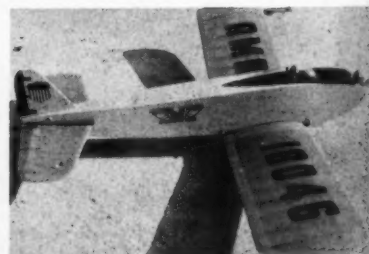
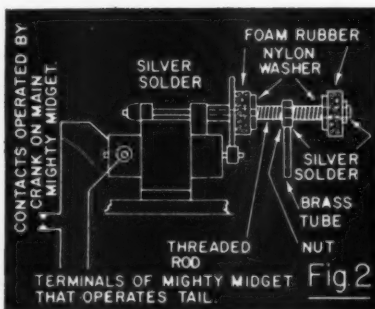
Below—Diode r'c'vr placed in plastic
tube. Rocket case, tuning rod, and
alligator clip are then discarded.



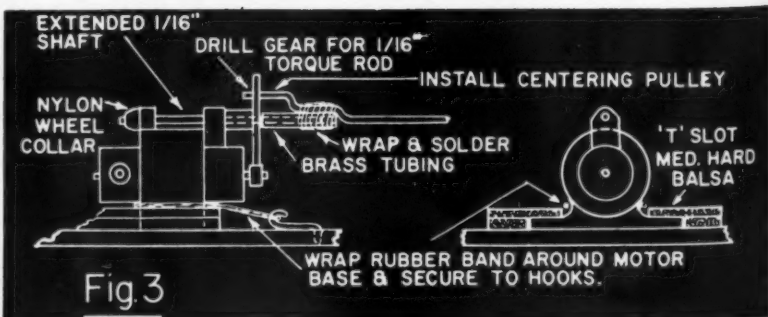
Below—How receiver is stowed atop
batteries, its ant./gd. anchored. It
does not affect X-mitter in any way.



**Monitor
for
Tone
X-mitters**



Gimlet, from MAN plans, William Northrop, Jr.,
Wilmington, Del. SM-1 r'c'vr, 26 ozs., underpow.



ship five pts.; attending three flying sessions or two flying sessions and a regular club meeting, two pts. per month and winning one of the Bay Area club trophies for speed, endurance or distance, 10 pts. Awards also apply to RC boats. Sounds like a real interesting program to maintain activity and benefit the members.

The Poughkeepsie IBM RC and Model Club has undertaken to build a six-foot model of the Clermont, in conjunction with the 350th anniversary of the discovery of the Hudson River. The model will be controlled with an eight-channel superhet system and will have electric drive. Gross weight, including the 80-amp battery for the drive motor, is 31 pounds. This RC model will attempt to duplicate the run of the original Clermont from Hudson, N.Y. to Staatsburgh, N.Y., a distance of about 25 miles. Not the most desirable design for a choppy sea, the run will be planned to take advantage of the outgoing tide in the river.

The past six to eight months has seen quite an increase in new clubs and activity. Mr. R. A. Wheatley, 200 Ashland Ave., Abington, Mass., announces the formation of The South Shore Radio Control Club, presently comprised of 15 members. Future membership will be limited to those holding AMA and FCC licenses. The bi-monthly meetings draw members from as far north as Boston and south to New Haven, Conn. Rex Welbaum, 212 S. Taft Ave., Evansville, Ind., advises of the formation of The Evansville RC Club with 20 active members. Most flying is rudder only with a few eight-channel sets in operation. Traffic light controls have forced a 50-mile trek to an old Air Force field.

The Westchester Radio Aero Modelers (WRAMS) have RC movies to circulate. Contact Paul Sauvin, 342 Marietta Avenue, Hawthorne, N.Y. RC movies from around the country are very interesting and point out the varying degrees of success obtained with different systems. Just saw the SE Virginia Roundup films from 1958 and there were plenty of shots of Walt Good and his Multibug. When you see these boys using the WAG and Simpl-Simul you'll really start thinking about it.

The North Jersey Radio Control Club is looking forward to a good year, what with some of the country's top RC men in the club. Christmas gifts alone in this club would have been enough to start a small hobby and RC shop. Signal generator, planes of all kinds, engines, camera and just about everything to make for an enjoyable RC season. Further south, The Central Jersey Radio Control Club is also extremely active. Leon Shulman found it easy to watch eight-channel flying, but flying it is different, but he'll make it. T. R. Long, J. Perucca and R. E. Davis have been working on a proportional system which it is hoped will give no wobble on the surfaces, give true proportional control, have low drain and sufficient torque. The main problem with their system is the servo, as it is with most other systems of this kind. You don't get anything for nothing and the servo generally draws several hundred mills or is on the heavy side. Otherwise, they seem to have thought it out quite well and may have something for summer flying. This issue of the Feedback, of the CJRCC group, was very informative and well written.

(Continued on page 36)

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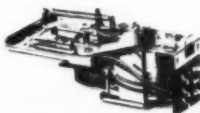
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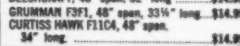
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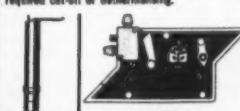
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Only 1 1/2 inches high. Rotations speed: 4000 to 6000 rpm. Standard motor for use on 3-V DC. Reversible brushes fitted for terminals. **\$2.95**

BEGINNERS! EXPERTS! SPECIALISTS!

THERE'S *Something for Everybody*

FOR BEGINNERS!

FLIGHT TRAINER

Kit S-16, Wing Span 24". For .09—.015 Engines
Designed especially for beginners in control-line flying!
As completely prefabbed as a kit can get... a beginner
can put it together in less than two hours! All wood, rug-
ged enough to take plenty of punishment, extremely
stable.

Completely carved wings and body, die-cut tail
surfaces, finished landing gear including
wheels, plywood parts for control system, etc.



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FOR RADIO CONTROL EXPERTS!

PIPER CUB J-3

Kit F5-6, Wing Span 34" For .09—.35 Engines

Especially designed for radio control, also turns in remark-
able performance as free flight or control line model!
Parts are beautifully die-cut and shaped, intermatched for
fast, accurate construction. Easy to fly... complete flight
instructions included!

Fully prefabbed of balsa and plywood, with
carved lower nose cowl, formed alumi-
num front cowl, authentic insignia, etc.

\$295

Trims excess plastic
"slick as a whistle"



Use an
x-acto®
inter-
changeable
blade
knife

- Makes assembling easier, faster, more accurate.
- Finished model is truly authentic and worthy of display as a permanent keepsake.

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Next kit you buy re-
member to ask your
dealer for an X-acto.
From 29¢. Illustrated
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X-ACTO, INC.
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In the middle west, the Peoria RC Club's Benoit Echerd used his Reb fuselage as a form for a fibre glass shell. The fuselage was first wrapped with Saran Wrap to prevent the resin sticking to the doped finish. Bulkheads were installed afterwards, using the fibre glass resin as cement. The project is said to look good so far. Bill Cander also fibre glassed the center section of his new CQ wing, adding but two ounces of weight as against the five to ten times increase in strength. In 14 degree weather, one of the members flew with his Citizen-ship 8-channel equipment and it functioned perfectly. At those temperatures we'll take your word for it.

Hal Bunting of the RC/NC group of Burlington, N.C. brought out his gleaming red, 6-pound 'buzz bomb' back in November. Powered with a Spitfire 65 and using Orbit eight equipment, only a few flights have been made to date, due to a new motor. Should be a hot item. This group ran into quite a bit of interference on 27.255 mc in 1958, with three jobs spinning in at one session. This club, as with others, selected a decal design from entries submitted by club members. This is one of the very few groups we know of that specializes in selecting an officer each year, whose prime duty it is to get information into the various model magazines. Many thanks.

Another new club decal came in from the Midwest Radio Control Society of Detroit. An interesting phase of RC work would be to have the various clubs around the country exchange decals. Some of them are really works of art and printing. This club flies Live Wires, Smog Hogs, Ascenders, Astro Hogs, and a few originals. Multi channel is mostly Bramco reeds, with 3v transistorized single-channel equipment.

An interesting winter project which should provide much valuable information is the testing of all RC equipment on the market. This equipment is purchased at club expense and then sold to club members afterwards. Various members are chosen every two weeks and turn in a full report in 30 days. So far, about 15 receivers and transmitters are available and a file is kept on each. Other clubs who wish more information on this can contact Bill Hughes, 10281 Troy Street, Oak Park, Michigan.

TECHNICAL TOPICS

Last month we presented data and schematics on a tone receiver by Phil Kraft. This receiver is one of the best we have seen, sensitive, non-critical and more selective than most receivers presently used. We did not check the selectivity but Phil states the bandwidth to be less than 100kc to a strong signal. With a transmitter on 53.5mc, the receiver will not be operated at a distance of four feet to another transmitter tuned to 53.6mc. This unit does not require 100% modulation, although it is preferred. This month we'll present the transmitter designed by Phil. Again, this is not a construction article. We did build and check this particular circuit and also used his modulator circuit on an Aristomopa transmitter. Operation was perfect.

The transmitter uses one 3A5 for the oscillator and output amplifier and doubler, plus two inexpensive transistors. The modulator is temperature stabilized to 140 degrees F. Our unit checked about 92% modulation at 420cps. A switch is shown in the schematic whereby you can shift from low to high power. Phil claims the full 135v has never been needed, everything operating from 67½ volts. As shown, the schematic is for 50-54mc operation. The figures for 27mc operation are our own.

IN THESE NEW

MODEL KITS By

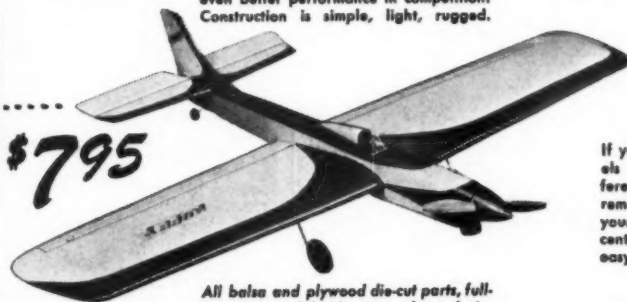
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For .29 and .35 Engines

Sensational contest-type full-stunt model... has been winning contests repeatedly all over the country! Designed by Lt. Lew McFarland... now improved for even better performance in competition! Construction is simple, light, rugged.

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All balsa and plywood die-cut parts, full-length curved fuselage top, formed wire landing gears, decals, silkspan tissue, etc.

FOR A CHANGE OF PACE!

LOCKHEED P38 LIGHTNING



\$395

Kit S-17, Wing Span 36"
For .15 Engines

If you're tired of building commonplace models... if you're looking for something different... this new BIG model of the remarkable World War II Fighter will satisfy your craving! Spectacular in flight, magnificent performance in the air! Fully prefabricated, easy to build.

Carved profile bodies, landing and trailing edges, etc. Die-cut balsa and plywood parts, formed wire landing gears, silkspan, authentic decals, etc.

When it's made by Sterling, IT'S UNCONDITIONALLY GUARANTEED
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Belfield Ave. & Wister St.
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Please send me a copy of the Sterling Catalogue. Enclosed is my 10c to cover handling and mailing.

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City..... Zone..... State.....

Frequency stability (AF) is: from 135v to 50v, downward about 50 cps; from 70F to 140F, upwards about 90cps. Various tone generating circuits were tried including a transistorized phase-shift oscillator. However, this last circuit required selected transistors and also was a bit slow for fast keying. Both the receiver and transmitter are excellent designs and the receiver can be used in 1/4 A models. A six-foot Cub was flown almost out of sight and back, using but 67%v on the transmitter. Naturally, not being a regular construction article, these circuits are not recommended for the beginner unless he has some advanced help. Fig. 1 gives the schematic.

Fig. 2 comes from the Peoria RC Club and shows the positionable servo developed by Dick Etter, Earl Dalton, Bob Draper and "Jim" (sorry no last name supplied). It was designed to be used with the Galloping Ghost system and works well on two to three volts. Primarily for use as an engine control servo, it should find other applications. The horizontal screw may be threaded brass rod and although not given, an outboard bearing would be advisable.

With increasing popularity of Simpli-Simul and other pulse systems using the Mighty Midget motor, Fig. 3 shows the method used by Albert M. Stott, 23 Albert Ave., Aldan-Clifton Heights, Pa. With Mighty Midget motors as hard to get as they are, any device to save them is worth while. The motor is held by rubber bands in a "T" rail and the torque rod connection is made in such a manner that you do not even need a set screw on the large gear. There is nothing difficult about building this mounting and it has the added advantage of having the motor removable by merely removing the rubber bands and sliding the motor out of the rails. Incidentally, the supply of MM motors is governed by the manufacturers in England and it seems they just can't keep up with the demand.

Just because there has been nothing said about FCC registrations in the past few months, we hope you make it a point to send yours in and to see that your fellow builders do the same. The granting of new frequencies was due in part to the increased number of registrations filed last year. If we want favors from the FCC in the future, let's be sure they know we are around. Play it safe and get that registration in.

Was it the receiver, a broken connection or the transmitter that caused that last crash? If you use a tone transmitter, Mr. O. K. Anderson submits the device used by Mr. Bernie Haire of Bernie's Hobby Shop, Dallas, Tex. We checked the idea out and found it to work very well with a number of tone transmitters. It will not give the proper aural indication with straight carrier transmitters. Practically no power is drawn from the transmitter and the device is ready made, installation being a matter of but a few minutes.

The heart of the system is a small diode receiver such as the Aristo Radio Ear. This comes with the earphone so there is nothing else to buy unless you want to dress up the installation and put a jack on the transmitter for plugging in the earpiece. The literature from Mr. Anderson indicated that the "works" of the receiver be removed from its case and placed in a plastic tube, as shown in the photographs. We (Continued on page 48)

3 The three at the left indicates that this is the third time that we have let our hair down to our customers and dealers in an advertisement of this type. It may well be the last as I have taken quite a ribbing to date about the first two. One older balsa butcher asked me who I thought I was, Charles Hampton Grant or Chester Lasso. The first picture shows the difference between the old and the new style Max 33 crankshafts. We read that the new one is the largest in diameter used in any 35. Delivery on these is pretty good now, don't wait for the summer rush. We have parts stocked for this new series as well as for the old series. These engines are factory test run — actually fired up and run on a prop. Our second picture is of the OS 9 — this engine though just recently introduced has a race car record under its belt. Most surprising for a \$4.95 engine; isn't it? Two specials while this issue of M.A.N. is current. An OS 9 and a PDQ Baby Clown for \$5.95



and an OS 9 and a Midwest R/C Aeronca for \$9.95. This is also available to dealers. You may be wondering what has happened to Controlaire in the low voltage all transistorized field. Next month we will announce our single channel transmitter and receiver (both under \$30), our 5 channel and 8 channel. We have our superhet circuit worked out — it should be commercially available in a few months. OS 12/4 props 35c each, other large sizes coming. Our WORLD ENGINES SILK has high wet strength and is easy to handle wet — compare it to other brands by actual wet strength tests. White 89c per yard colored \$1.00. Send 15c for our new catalogue with specs of many interesting 15 size engines — the AMA has gone to 15c in class "A" speed and recognizes the F.A.I. FF. J.M.



WORLD ENGINES

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Berkeley R.C. SCALE



"BUSTER"
For .15 to .35 Engines
3" Scale - 48" Wingspan
\$9.95



CESSNA "172" **\$8.95**

BIG 1 1/2" SCALE - 54" WINGSPAN - .09 to .19 ENGINES

Here is the latest scale "Cessna" that is a "natural" for radio control. The big gross ship take-off and landings with "hands-off" control. The model handles just as easy! It's a model builder's dream ship!



"PIPER CUB J-3"
The "Piper Cub J-3" needs no introduction. Most famous of all light aircraft, it's a natural for R.C. or Free-Flight flying. The six foot span permits the extra R.C. installation that you dream about.
2" Scale - 68" Wingspan
For .23 to .65 Engines
\$10.95

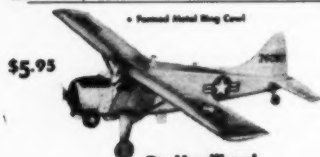


NAVION "Super 260"

This beautiful scale replica of the famous "Navion" is a fast, rugged and truly different R.C. or Free Flight design, easily adapted to Control Line flying. Thrill to its flying performance and smooth response.



CESSNA "170"
Controlling your "Cessna 170" by Radio is a thrill you will not forget! Perfect in scale, rugged, stable in all attitudes, yet responsive in control, with good wind penetration qualities. The gear location is ideal for extended take-off runs. The large-than-average size makes it easier to control in windy weather.
For Radio Control - Free-Flight - PMA-Land
For .35 to .38 Engines - 77" Span - 2" Scale
\$14.95



De Havilland "BEAVER"



Piper "TRI-PACER" **\$3.95**

by BERKELEY at your local dealer!

If no local dealer is convenient, mail orders will be filled by Berkeley Model Supplies, Dept. R.A., West Hempstead, N.Y. Please include \$2.00 packing & postage.

MAN at Work

(Continued from page 31)

To our questions, then, we must add the most vital of all, did the Contest Board Members, in particular the Chairman, thwart the will of the majority. And so, back to the popular vote.

► Before us is a 12-page document which would require several fingerprint pages of this magazine to give in full. It lists the vote by membership and CB membership, side by side, on every point of the rules. Radical changes occurred this year in speed, class and engine displacements; in free flight gas, where classes and power loadings were drastically altered. As Hunter, a free flier, said of the latter, this is the "big one." It is the one change that precipitated the uproar. To it, therefore, we confine this investigation. From the final tabulations (true copy) supplied by Headquarters we extract:

1. Should the classes be revised?

Modeler Vote

Yes-408 No-361

A. If classes revised:

1. 4 Classes: .000-.050, .051-.200, 201 and over, and FAI

Modeler Vote-429

2. 3 Classes: .000-.050, .051 and over, and FAI

Modeler Vote-220

B. Should the maximum displacement limit be reduced from .650 to .350?

Modeler Vote

Yes-265 No-454

II. Should the power loading be revised?

Modeler Vote

Yes-369 No-339

A. If revised:

1. Eliminate power loading

Modeler Vote-174

2. Increase power loading:

a. 150 oz. per cu. in.

Modeler Vote-164

b. 173.4 ozs. per cu. in. (same as FAI)

Modeler Vote-254

c. 200 ozs. per cu. in.

Modeler Vote-65

Contest Board Vote

Yes-18 No-5

Contest Board Vote-14

Contest Board Vote-7

Contest Board Vote

Yes-4 No-19

Contest Board Vote

Yes-16 No-7

Contest Board Vote-3

Contest Board Vote-4

Contest Board Vote-15

Contest Board Vote-1

In other words, the popular vote and contest board member vote on "this is the big one" favored a class revision; of .000-.050, .051-.200, 201 and over, and FAI; and a power loading revision to 173.4 ozs. per cu. in. Some people, including advisory committee members checked by telegraph, thought the phrasing of the questionnaire did not permit voting for things as they stood. The point, however, is that the majority of popular and CB votes both stated both classes and power loadings should be revised.

Did the Contest Board thwart popular wishes? Certainly not in this "the big one" that triggered the protest. But what of the overall picture? In several cases they did overrule the popular vote. Here's a list of the important instances, extracted, out of context.

II. Should the minimum line lengths be increased:

A. In 1/2A?

Modeler Vote

Yes-229 No-285

Contest Board Vote

Yes-12 No-11

I. Should the number of flights be reduced 9 to 6 (only outdoor glider):

Modeler Vote

Yes-323 No-330

Contest Board Vote

Yes-14 No-9

II. Should wing area restrictions (30 to 130 sq. in. for outdoor, and 100 sq. in. max. for indoor) be eliminated?

Modeler Vote

Yes-335 No-302

Contest Board Vote

Yes-8 No-14

In two other cases, the CB voted against actuated brakes and steerable tail wheels in radio rudder only, with a near tie popular vote; and against revising maximum limit on engine displacement in radio py-

lon, where popular vote strongly favored such revision.

By now, the thinking reader will be wondering. How then did the dissident free fliers decide that the vote had been ignored? The Coast petition blames this on one man, the contest Chairman, who is quoted somewhat inaccurately out of context, from a letter of instructions sent by him to other members: "Contest board members will please study, analyze, and look for trends on rules questionnaires. Voting results are not a mandate. The Contest Board and no one else is responsible for writing the rules. Understand that your vote need not co-incide with the views of the majority in your area." The above statements are justified in the Chairman's opinion stated Hunter, by the following: "Since the majority of members do not

understand the aspects or problems concerned with National Competition." The italics are Hunter's.

Taken in context, the Chairman's statement provides a considerably different view: "Please study them, analyze them, and look for trends . . . BUT DO NOT FEEL THAT YOUR VOTE MUST BE IDENTICAL. This is a questionnaire, and the results are not a mandate. The Contest Board, and nobody else, is responsible for the writing of the rules."

In voting, Hatschek said to the Contest Board, "Please consider fairness above all—but be sure to remember the mechanics of running a contest. And don't fail to forget that contest personnel are often severely

limited both in number and experience; give them a break."

On the Contest Board Ballot forms, each (Continued on page 40)

AMBROID & BRODBECK OLD FRIENDS!



Reprinted from the Nov., 1940 "Model Airplane News", this photo shows Johnny Brodbeck of Torpedo engine fame and one of his trophy winning model planes — built with Ambroid cement of course!



List the many top-notch modelers who use Ambroid and you'll have included the names of most of the leading people in the model plane industry. Johnny Brodbeck of K & B Allyn — manufacturers of the famous Supersonic fuels, Torpedo and Fury model engines — is a typical example. A user for over 20 years, Johnny says "There is none better than Ambroid and I still use it, as does my 22 year old son (who started building at the age of 4!), for his R/C models."

Incidentally, that heading photo was taken at the Western and Rosecrans Precision night flying contest, Los Angeles, on August 24, 1940 — where Johnny won the Nathan R. Smith Trophy (ignition coil manufacturer), a Bunch Tiger engine, 5 yards of silk and a carton of Ambroid cement! The model was a Ludwig Kading design, powered by a trusty Brown Junior.

Nowadays, Johnny Brodbeck confines his contest activities to keeping the boys flying — with his K & B Allyn "on-the-field" engine repair service. That's Johnny on the job (left) at the last Nats!



"EXTRA-FAST" AMBROID
FOR LIGHT MODELS
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"REGULAR" AMBROID
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"REGULAR" AMBROID
1-3/4 Oz. Tube . 30¢
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"EXTRA-FAST" AMBROID
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20 cc. Tube 15¢
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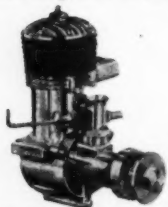


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FORSTER



On July 13, 1958, George E. Ganter, Jr. of Reading, Pennsylvania, set a new National Endurance Record of 2 hours, 12 minutes and 1 second, on 30 ounces of fuel, using an UNMODIFIED Forster Model 29R engine.



TALK ABOUT RELIABILITY AND FUEL ECONOMY! THIS IS IT! THE ADVANCED ENGINEERING THAT MADE THIS RECORD POSSIBLE INCLUDES A SPHERICAL COMBUSTION CHAMBER LIKE LARGE AIRCRAFT ENGINES, A NEW "PRECISION CAST" LAPPED, CAST IRON PISTON, A HARDENED AND GROUND CRANKSHAFT WITH SQUARE PORTS, AND A SUPER STRONG FORGED ALUMINUM CONNECTING ROD. THE NEW SCIENTIFICALLY DESIGNED CARBURETOR GIVES HIGH FUEL LIFT WHICH MAKES FORSTER ENGINES EASY TO START AND MISERLY ON FUEL. BUILD YOUR NEXT PLANE OR BOAT WITH A FORSTER ENGINE TO STOP FUELING AROUND AND ENJOY YOUR HOBBY!

THERE ARE EIGHT FORSTER MODELS TO CHOOSE FROM:

29R & 35R	Air Cooled	\$14.95
29RC & 35RC	Speed Control	\$19.95
29RW & 35RW	Water Jacket	\$19.95
29RCW & 35RCW	Water Jacket & Speed Control	\$24.95

BESIDES ALL THIS, YOU GET UP TO \$5.00 TRADE-IN ALLOWANCE FOR YOUR OLD ENGINE AT YOUR AUTHORIZED FORSTER ENGINE DEALER.

SEND COUPON FOR HIS NAME & ADDRESS AND FREE DESCRIPTIVE LITERATURE.

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Can be used in Gas, Radio, Rubber, Scale and Glider Models, even Missiles. Can be changed from one model to another in seconds

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FOR 1/2A PAA LOAD AND FREEFLIGHT

If you are a beginner in "free flight" or an expert looking for an easy to handle design this realistic looking model is for you! Either for PAA load or regular flight every item of its design is aimed toward superior performance with the least amount of effort. Try this easy to handle "Clipper" now!

SPECIFICATIONS
Wing Span 14" Area 100 sq. in.
Wing Loading 1.5 oz./sq. in.
Weight 1.5 oz.
Power 1/2 cc. engine
Motor 1/2 cc. engine

"LIVE WIRE"

GREAT NEW MODELS IN THIS FAMOUS DMECO FAMILY!

THESE ARE SIMPLE TO FLY MODELS, RUGGEDLY BUILT IN THE "LIVE WIRE" TRADITION

KITS CONTAIN...
☐ Detailed full size plans
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☐ One medium sized motor
☐ Complete rubber band motor

MODELS FEATURE...
These biplane loadings concentrate and evenly strong surfaces using large shaped leading and trailing edges with open, fuselage adaptable for use with all engines.



\$4.95

② IS THE "KITTEN"

FOR 1/2A R/C SPORT FLYING

Developed for use with the new compact light weight R/C units the "Kitten" takes every advantage of this fine equipment. The "Kitten" is one model that can be flown in restricted areas, a football field is large enough! Proper design gives the ruggedness and maneuverability for this close area flying, assemble it quickly and enjoy many fine flights!

SPECIFICATIONS
Wing Span 14" Area 100 sq. in.
Wing Loading 1.5 oz./sq. in.
Weight 1.5 oz.
Power 1/2 cc. engine
Motor 1/2 cc. engine

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"Home of Design-engineered Models"

1833 HARLEM RD. BUFFALO 15, N. Y.

SEE YOUR HOBBY DEALER

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a waste of funds, as charged?

Inasmuch as a regular edition of Model Aviation was used for the mailing, no unusual expense was incurred. Due to the lateness in preparing the draft of the questionnaire, AMA officers considered a separate mailing, but concluded the \$500 rough cost would not have been justified by the three to four days saved.

► What of the manufacturer's quotes, in the Hunter protest?

One said, "Leave rules alone." Rules left alone would never change. Had rules been left alone, you would be flying Zippers, and would be required to submit cross section information, go by an 80-ounce power rule, have your wing area computed, and stand in line a goodly part of the contest day. Or, worse yet, have your fuel measured and given you on the basis of 1/4 ounce per pound of airplane. Or have no motor run limit. These were once rules. Plainly, rules must change with the times.

Whereas modelers always have been quick to shout down "commercial interests," we now have concern, expressed for them in a protest. We'd like to say that Contest Board Members should consider the effects of proposed changes on manufacturers. In a practical sense this is impossible. The CB could find itself reversing the desires of the modelers—and so more protests! Since any change always affects some engine or kit, rules procedure could be stymied. What happened to the speed .49 engine? CO-2? Can we ever drop an event, say helicopter?

Despite manufacturers' quotes (were they misinformed?) the AMA members not only had the right to vote, but did vote, and the changes voted for were carried out by the CB members. Nor were American rules thrown out, and foreign rules adopted. Power loadings were required to be increased and it is, perhaps, an unfortunate co-incidence that the preference happened to be FAI, or about 173 ounces. It might have been 150 (30 Californians voted for this).

Does the average contest modeler prefer the old class and power loading rule? It is so claimed. This is supposition and, as such, should not be permitted to confuse the already heated debate. Of the votes cast, 45% were against the change. Applying this percentage to the total AMA membership, had everyone bothered to vote, we would have 9,916 people against the change. Any circulated petition would require over 11,000 names in order to be conclusive.

► Of Hunter's five suggestions, we have adequately considered the first two: Publish voting results, including CB members (the free flight vote was analyzed on the disputed points—a 12 page document showing complete results is on file and MAN or AMA, latter preferred, has statistics available); abide by majority vote (vote is Hunter's word) for '59 or use old rules—the rules were changed, and we should abide by them as Hunter demands. We must not stop here. The AMA by-laws place authority for making rules squarely on the shoulders of the Contest Board. The Constitution does not spell out precisely—the questionnaire is not required by by-laws, for example—rules making procedure. It should. The by-laws must be modified, or amended, to make impossible another debacle such as the one that has resulted from the 1950-60 rules balloting. It is not this column's place to make such recommendations nor to report recommendations so prematurely. MAN at Work firmly believes that this should be spearheaded by

(Continued on page 44)

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WASTING MONEY FOR EXCLUSIVE MONEY SAVING VALUES!

Lee's Has Items Every Modeler Needs

THE CEMENT WITH THE GRIP OF STEEL

LEES HOT FUEL PROOF ONE FULL PINT ONLY

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TERRIFIC COMBINATION OFFER!

Here's What You Get ...

FULL PINT OF CEMENT	\$1.79
GLUE GUN & DISPENSER	.98
THREE EXTRA NOZZLES	.25
TOTAL	\$3.02

IF YOU PAY ONLY TWO DOLLARS

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SEND CASH CHECKS MONEY ORDERS

GLUE GUN

ONLY WITH STORAGE UNIT

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SEND NOW

OFFER IS FOR A LIMITED TIME ONLY THIS INTRODUCTION OFFER—IS ALSO AVAILABLE AT ALL LEE'S AGENCIES

POWER CONVERTER

RATING
IMPACT 4.5 V —
45 V OUTPUT
IMPACT 3 V —
30 V OUTPUT

\$11.95

AT LAST! 1-INCH SHED-RESISTANT BRUSH

ONLY **\$1.25**

OTHER FINE LEE'S PRODUCTS

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• LEE'S GLOW FUEL		.45	.79	1.40	4.95
• LEE'S CLEAR DOPE	.40		1.20	2.19	8.50
• LEE'S COLORED DOPE	.45		1.50	2.89	10.95
• LEE'S CEMENT	.50		1.79	3.19	10.98
• LEE'S GRAIN FILLER	.40		1.20	2.19	8.50
• LEE'S BALSA PUTTY	.79		2.98		
• LEE'S KWIK KLEEN		.35	.59		
• LEE'S THINNER	.35		.90	1.65	5.25

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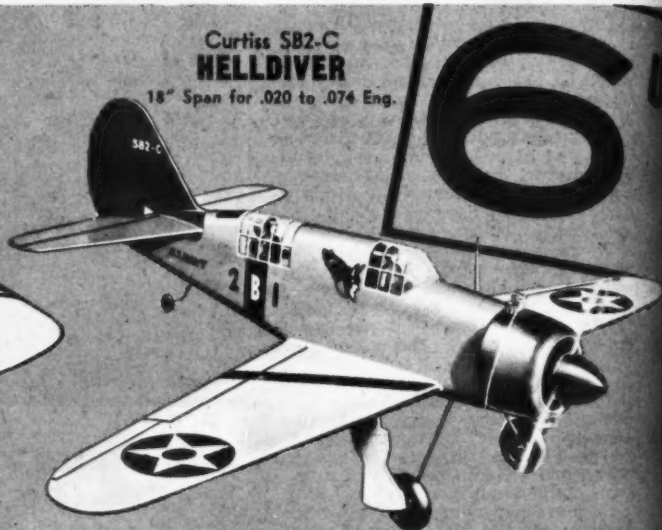
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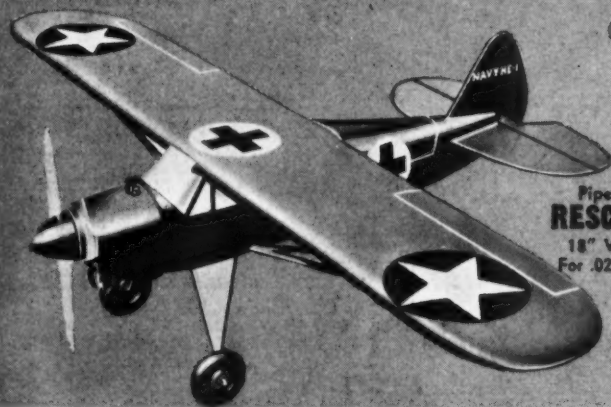
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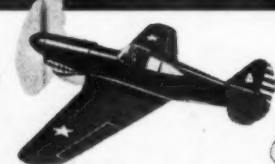
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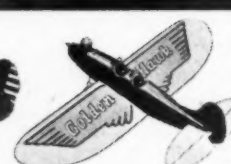
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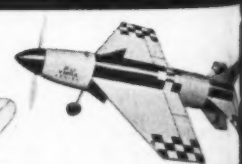
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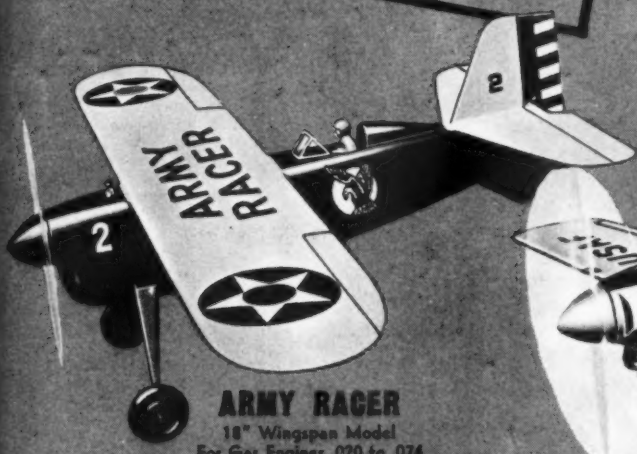
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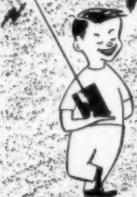
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the Coast group who may already have a fine "committee" in Gilliam, St. Jean, Stan Hill, Bob Hunter, who with headquarters, can hammer out suitable by-laws on which presumably more than 5% of the membership will be interested enough to vote.

Twin Lizzie

(Continued from page 10)

1/2" x 4 1/2" from a sheet of hard 1/32" balsa. These blanks should be stacked with one edge and one end aligned and two straight pins inserted to hold the stack together. The block of blanks should be rubbed over a sheet of sandpaper to create a perfectly flush bottom edge. The rib pattern is now marked on both outside ribs. With a sharp knife, trim the entire stack to shape as a unit, finishing the shaping with a sanding block. The notches should be cut carefully, using a short length of hacksaw blade or a sharp razor. The ribs now can be carefully separated and the tip ribs, B, C, and D, cut out separately.

The wing is assembled one panel at a time, starting with the left main panel. The leading and trailing edges are pinned to the wax paper-protected plan and ribs added, allowing one half hour to dry. The pins then are removed and the assembly shifted so that the right main panel is now on the plan. The remaining ribs are now added, including tip ribs B, C, and D. The top portion of the trailing edge now can be placed. Notice that it will be necessary to crack this assembly very carefully to proper dihedral angle to coincide with the bottom portion of the trailing edge. The spar can be placed and the soft balsa tip balsa blocks added. The wing is removed from the plan and 1/16" balsa filler panels added to the bottom of the center section. Any irregularities in joints should be sanded smooth before adding the 1/32" x 3/32" cap strips and 1/32" center section top covering.

Next, the leading edge is shaped with a sharp knife and sanding block to the cross section shown in the side view, and the entire assembly carefully sanded. All joints in the structure are daubed thoroughly with a 50-50 mixture of cement and thinner; this will double the strength of the wing.

The wing is ready for covering. Cut Silkspar to approximate size for covering one panel at a time. The bottom is covered with two pieces, the top with four. Start with the bottom, trimming the edges before covering the top. Use smooth paper to avoid wrinkles. Slow-drying mucilage gives you plenty of time to draw the paper up tight and even before setting. The paper next should be wet and doped as was the fuselage. It is advisable to pin the wing down while the top side is drying to avoid warps.

Part number 7 can be added, and part No. 6 placed to match the angle of part No. 8 on the top of the fuselage. The 1/32" cover is cut to size and cemented down, being held in place with pins while drying. The wing should be held in place on the fuselage while this fairing is sanded to match the fuselage perfectly. The fairing is doped and covered with paper.

Tail assembly: The elevator is cut from medium-hard straight-grained 3/32" balsa, and sanded smooth. The leading and trailing edges are rounded as shown on side view. The rudders are cut from medium 1/16" balsa, and lightly sanded and rounded. All tail surfaces receive a coat of clear dope, and a sanding with light sandpaper before rudders are cemented to ends of elevator, keyed in place by notches.

The previously made tail fairing block now is added, with the elevator held in

place on the fuselage for proper fit. The 1/16" balsa keys are added to the bottom of the elevator, with care exercised to get them in the right position as shown on plan. Cut rudder tab free and mount with soft copper wire.

Finishing: Before painting the model, the inner wheel retainer washers are soldered in place. All parts of the model should be checked over to be sure that you are satisfied with your sanding job before proceeding to paint. If you have access to a spray gun, this method is preferable. However, a careful job using a soft, half inch, square-cut brush will be quite satisfactory. The wing, fuselage and tail assembly are given one light coat of white fuel proof dope, followed by a final sanding with grade 00 sandpaper. Then put on another coat of white, giving the interior of the cabin and cowling adequate covering. Next, paint the instrument panel black and add white discs for dials.

The windshield is added before trimming. It is cut from medium weight celluloid (approximately 1/64") using the pattern on the plan. It is best to check the fit first with a paper pattern since no two models will be absolutely identical. The fitted windshield is placed over the front wing mounting dowel and cemented down on one side of the cabin only. Do not use excessive cement and glue around outer edge only. When this side is set (about 10 minutes), cement down the other side. It is better to hold the windshield in place by hand while drying rather than using pins which leave unsightly holes.

If you are spray painting, mask off the windshield following the outline shown on plan and spray another coat of white on the fuselage. A mask can be made easily by tracing window outlines on heavy tracing paper, applying masking tape to paper, cutting along line, and then stripping off the paper backing. After spraying, the tape should be removed carefully to avoid peeling paint. If brush painting, paint the window outline first; then fill. The 1-5/16" wheels are added, retaining washers soldered in place, and painted.

Select a trim color of your choice and paint the areas shown on plan. These are: upper portion of front end of fuselage; leading edge of wing; and tips of rudders. The trim job is finished off by adding the stripes below the solid color areas as shown. If you have sheet decal colors to match your trim color, the stripes can be cut from these. Then place decal numerals on fuselage sides and top of wing. Suitable black and gold numerals can be purchased at most paint and glass stores.

Flying: The wing and tail surfaces are held in place by four 2" rubber bands each, approximately 1/32" x 3/32". Fewer rubber bands would permit the wing surfaces to wobble under pressure; more would prevent the surfaces from popping off in a crackup. Check the model's balance and the alignment of flying surfaces before any flights are made. The model should be glide tested for proper trim by hand launching over grass. The ship is very buoyant and should be launched gently into a light breeze with the nose pointed slightly down. The proper glide should be a long smooth curve, flattening out before touching down. If the model drops heavily, adjust by placing a 1/32" block under the trailing edge of the elevator. A stall should be corrected by placing the block under the front edge of the elevator. It is important to distinguish the difference between a slight stall and a slight dive as the model ends up on its nose in both cases. In a stall, the model will hesitate with its nose slightly high before diving into the ground. If the model

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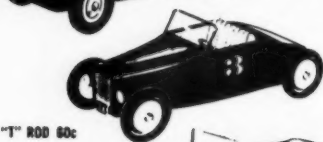
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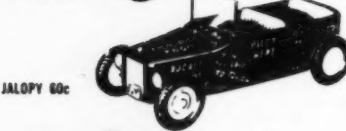
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shows a tendency to swerve sharply in these short glides, check the wing for warp. Needless to say, all flying surfaces must be absolutely true.

When you have achieved a straight, flat glide, try a short flight under low power. A hand launch in calm air is best. If there is a breeze blowing, be sure it is coming from the left front. Stalling or diving tendencies under power can be adjusted by inserting a hardwood wedge behind the engine at the top to correct the stall, at the bottom to correct a dive. The torque of the engine will cause the model to circle to the left under power. The rudder tab should be offset 1/16" to the right in order to obtain a slight right circle in the glide.

Do not attempt to fly Twin Lizzie in strong or gusty breezes until you have become thoroughly familiar with its flight characteristics.

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Balsa Wood
1 pc. 1/32" x 3" x 36" hard balsa; 1 pc. 1/16" x 2" x 36" medium balsa; 1 pc. 3/32" x 3" x 12" medium balsa; 1 pc. 1/4" x 2" x 18" medium balsa; 3 pcs. 1/4" sq. x 36" hard balsa; 2 pcs. 1/4" x 1/4" x 36" hard balsa; 1 pc. 1/4" x 3" x 3" soft balsa; 1 pc. 1/4" x 3" x 3" soft balsa.

Dope

4 oz. clear fuel proof; 8 oz. white fuel proof; 1 oz. color fuel proof.

Music Wire

1 pc. 3/32" x 8"; 1 pc. 1/32" x 6"; 1 pc. 1/16" x 6".

Miscellaneous

1 pc. 1/4" x 3" x 4" mahogany plywood; 1 pc. 1/64" x 12" x 5" celluloid; 1 pr. 1-5/16" rubber wheels; 4 3/16" washers; 3 ft. No. 30 linen thread; large tube fuel proof cement; engine mounting bolts (to suit engine); 8 1/32" x 3/32" x 2" rubber bands; decal numerals.

Dawn to Dusk

(Continued from page 26)

a Mighty Midget motor, mounted on a metal channel-base which could slide on two music wire runners or tracks which passed through holes in the chassis end. Rubber tension moved the motor one way, to break electrical contact. Compression of foam rubber moved it the other way when turns were 75% expended. Springs were balky. Rubber bands were promising but could break. An old Sigma relay contact was the fixed contact, and a brass strip, bent for wiping action, the movable contact. This motor did not boost electrical requirements beyond the ability of the normal Yardney and Volta Bloc battery packs supplied for actuator and radio.

Such a crude winder (and remember we were in a jam as the season ran out) was a calculated risk. Unfortunately, ship No. 3 required a variation of equipment for balancing and the winder was moved behind the tank with a short rubber motor. (No. 1 had winder, No. 2 geared rubber motors) The winder then was unreliable. Rubber actually loses tension for a time after a row of knots is put in—with a short motor we had to exceed a row of knots for reliability of control. The winder would actually slide the wrong way, reversing itself, after the row of knots was achieved. Eventually, it would do its job and shut off but then 2 1/2 to three rows of knots were present and ten such windings would wreck most rubber strip. Despite imported Perelli, prospects were bad. A winder therefore should be based upon rubber torque, and not tension.

Why not a servo? Neat, practical, and it should do it. Unfortunately, one of our pilots flies Vari-comp fliers and fouled up

(Continued on page 48)

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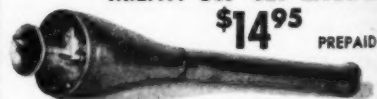
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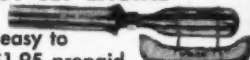
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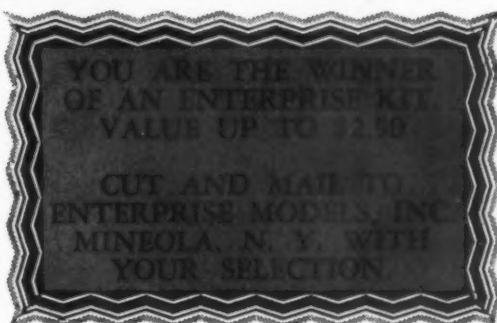
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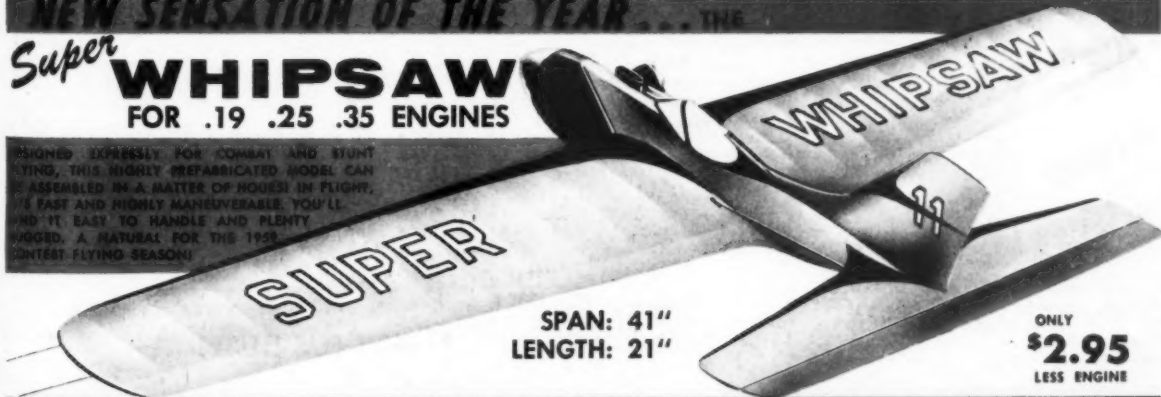
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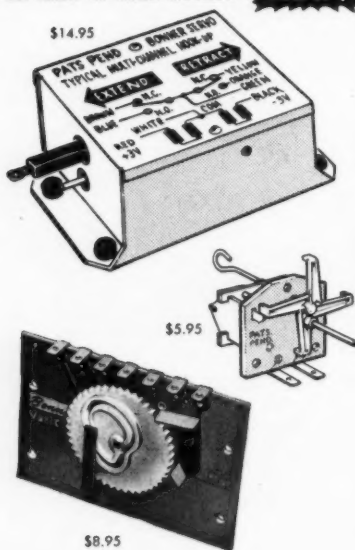
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the slower, timed signaling for a compound servo, particularly when the airplane was far out, or in a position requiring quick action. Others may find this simple—the solution.

For test ships Nos. 3 and 4, three-channel will be tried. Two channels will be used for left-right of a multi-servo, third for spoilers. Choice now is a reed receiver or a filter receiver. Will reed banks operate continuously for 13 hours or so without adjustment? Reeds should be endurance tested on the bench—if you don't mind using up good equipment!

Field and flight procedure: Here, bitter lessons were learned. Suffice it to say that allowance must be made for a take-off of 300 to 600 feet, with such gross weights depending on wind, followed by a shallow climb-out that might cover between 2000 to 3000 feet of ground before a safe 180-degree turn is possible. One plan is to station unwind, say 1500 feet from take-off run beginning, a second pilot and transmitter. The first pilot might sit on the hood of a slowly moving car to follow the take-off and early climb out, at a safe distance. It probably is wise for the first man to carry on until the two people are close enough to talk, allowing the upwind man to take over. (We crashed one airplane through a misunderstanding). The take-off pilot can then return toward the starting point when desirable. A third pilot should remain at take-off spot to back up. You just cannot plan for every contingency. The problem is less severe with a 5-6 hour airplane.

Wing and tail hold-on problems: You can't stretch rubber over a wing, or tail, and expect it to hold all day in the hot sun—certainly not with an exhaust pouring over it. Internal springing, or rubber, from left and right panels through a fixed centersection, the wing being strut braced, is one solution. But this interfered with our spoiler linkages from the center section escapement. On attempts, we used rubber, plus twine, and contact bond cement to help prevent shifting. You might even cement the surfaces on, or bolt them down, for the main attempt, but crack-ups would be devastating.

Some final notes: Biggest flying problem is control of altitude—how to get down from excessive heights, without stopping the engine. Planes like these are thermal happy—idling the motor was a waste of time. However, FAI rules have been changed, permitting maximum loadings of over 24 ounces per square foot of flying surface (wing and tail) projected area.

This is no help to our Diesel-powered machines but will be some aid to the glow plug people with their enormous loads of fuel. Our .09 Diesel burns less fuel per hour than a Cox Pee Wee .02. However, as fuel is burned, the super-duration glow job, having a greater disparity between loaded and empty weight, should present similar problems. Elevators, throttle, spoilers, or combinations thereof, or even drag flaps, leave the designer a wide choice.

As recounted in article one, spoilers give a nose-down attitude relative to the spoiler size. There may be a moderate speed pick-up, but nothing like the whistling dive you get from elevators. Big spoilers would produce a steep dive. But without a method of maintaining level flight trim with spoilers out, it can be tough and go on a hot day with strong thermals about, whether spoilers really will bring down the ship. A logical projection of the spoiler design is additional channels or means of putting in up-trim, which in turn would allow sufficiently big spoilers to produce a definite sink regardless of conditions. This might resemble a mild dethermalizer action.

This problem of altitude control surely can be solved in a number of ways by enterprising modelers. Many other groups will be trying superduration flights this year, thanks to these dawn-to-dusk experiments. One man has flown seven hours in tests, hopes for 12, and then the record try. Another crew is using proportional pulse on rudder and flippers with an optional neutralizing device on the actuator to give a choice of bang-bang control or smooth technique, as the occasion calls for.

—Norman Rosenstock

Radio Control News

(Continued from page 37)

don't think this is really necessary and our unit worked in the original case. You should remove the iron tuning slug and perhaps remove the fins from the rocket body. Find a suitable spot for stowing the diode receiver inside the transmitter case and either connect the antenna lead from the receiver directly to the base of the transmitter antenna or wrap about five turns of the receiver antenna around the wire leading up to the transmitter antenna base. Since there is a wide variation between transmitter frequency (RF) and the diode receiver, there is practically no absorption of transmitted RF power, the receiver merely picking up part of the AF signal. When the

(Continued on page 50)

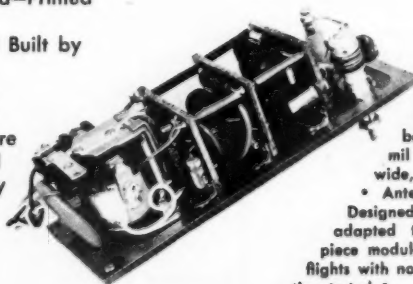
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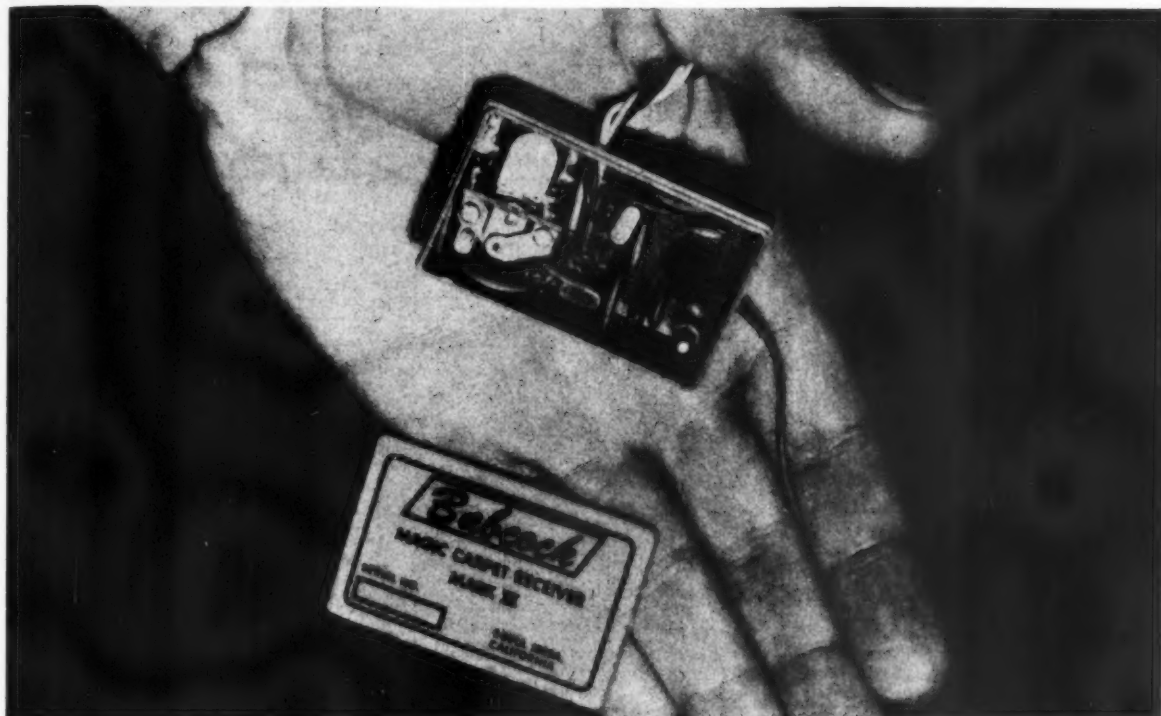
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Measures $1\frac{1}{2}'' \times 2\frac{3}{4}'' \times \frac{1}{8}''$, weighs only 1.7oz. Powered by 9-volt battery (about pencil size) the complete receiver and battery totals only 2.4 oz!

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There is no smaller, lighter combination. Now you can save on weight without sacrifice of performance.

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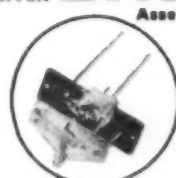
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Single channel MarcyTone Receiver measures 2x2-7/8x1, weighs under 3 ounces. Includes tube, three transistors, relay, filter, all capacitors and resistors. Only. **\$17.95**



MarcyTone Transmitter contains two 3A5 tubes - MOPA RF and multi-vibrator audio; Variable Frequency Oscillator, permits selection of 1700 to 7000 cps; slight modification allows unit to be used with other single channel audio receivers; 100% modulation; aluminum case 3x5-1/2x8 inches; expandable merely by plugging in control box; complete with tubes, 13 mc crystal, resistors, capacitors - everything required except batteries and 3 foot section music wire antenna. **\$18.95**

6 Channel MarcyTone Receiver - Basic RF and amplifier unit as well as 6 filters, 6 relays, 8 transistors and all other required components. Weighs under 10 ounces. **\$53.95**

6 Channel Control Box, converts transmitter above. **\$18.95**

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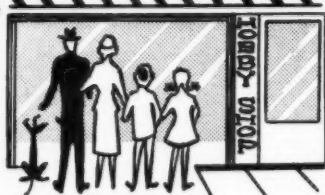
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transmitter is tone keyed, the signal may be heard in the earpiece, thus assuring you a signal is being sent. Should the RF section of some transmitters go bad, the tone level will greatly decrease. Photographs show the parts required and how the unit has been placed in a CG T-8 transmitter.

NEWS ITEMS

The Ungar Electric Tools, Inc., makers of the famous Ungar soldering pencil has a soldering pistol which takes all Ungar interchangeable tips—\$3.00 for the bare pistol or \$4.50 packaged with a chisel tip. The great variety of iron tips, both in wattage and heat rating and in shape, should handle just about anything in the RC field, from soldering printed wiring patterns to heavier chassis work. Available at most radio supply houses. Quite a few industrial firms use the Ungar iron for printed wiring work.

Babcock's new Magic Carpet Mark III receiver, enables the modeler to fly with an

all-transistorized receiver that can operate with an inexpensive, unmodulated, low-powered transmitter.

It is packaged in a tiny plastic case, 1 1/2" x 2 3/4" x 3/8". Weight is 1.7 ozs.

The Mark III is designed to operate with an RCA 9 volt battery #VS309, or equivalent, which weighs .7 ozs., making the entire weight of this radio and its batteries only 2.4 ozs. This is ideal for R/C with the new .02 engines, as well as Babcock's own all-plastic Aeronca and Tri-Pacer.

The 9 volt battery is used in many pocket radios and is about the size of a single pen cell. The circuit is composed of a super-regenerative detector using a surface barrier transistor. This in turn is followed by two stages of transistor voltage amplification and a 4th stage which makes use of a transistor for relay control in the Babcock circuit. The receiver operates over a wide-range of temperature. The price is \$27.95.

Looking for a new source of sub-mini-
(Continued on page 52)

The First "Superhets" Citizen-ship



SSTR superheterodyne, single channel, L, requires no filament, uses 9v hearing aid, bought anywhere for transistor r'cvrs. At 4 ma idle, plate rise to approx. 25 ma. Two IF stages. "Super-het" crystal controlled.

SS-MSR-B, same read, audio section as Bc simul, but "superregen" front end and replaced by "superhet." No filament, a 15v hearing aid. Idles 19 ma, 20 ma when relay closes. Both single c., top, Bc, here, operate on any approved spots, come 27.145 or 27.045.



New Look in Batteries

(Continued from page 18)

installed horizontally, as one would lay them on a flat surface. If installed vertically, standing on edge as a quarter might be balanced, the electrolyte may not completely cover the plates, resulting in reduced battery capacity.

Connecting button cells in series to form a battery of higher voltage may be done by stacking (placing one on top of the other, front to back), provided insulating separators are placed between the cells. This is necessary to prevent shorting across the insulating seal. Connection from one battery to the next can be made with a rivet or eyelet through the center of the insulating material. The foregoing applies only to the button cells, not the VO-800.

VO-800 batteries should be mounted vertically (standing on their base) with the terminals up. This, again, insures that the electrolyte completely covers the plates.

Some suggested battery holders are

shown in the photographs. They are quite simple to make and to adapt. For proper operation, VO series batteries really should be constricted (squeezed). These holders are of this type. The largest holder is designed for four VO-500's or four VO-250's and is shown wired for servo operation. VO-250's, incidentally, should adequately power up to 5-channel servo systems. By scaling down, this same type holder could be used for VO-180's and 100's. As shown with VO-500's, it measures 3 3/4" x 1 1/2" x 1", and weighs five oz. complete. About two ounces is saved over mediums. This type holder can be mounted almost anywhere in a model (CG allowing) since it is not necessary to remove it for charging or checking.

The top and bottom can be made from 5-ply 1/2" plywood in dry climates; 1/16" micarta would be better for damp weather. Since this holder utilizes the stacking technique mentioned earlier, an insulating separator must be used. This separator may be

(Continued on page 52)

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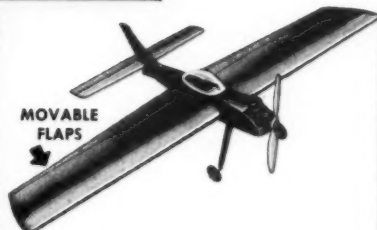
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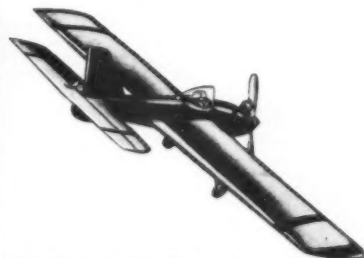


EXPLORER 56" wing span R/C model. Wing area 560 sq. in., Engine .15 to .25. \$14.95

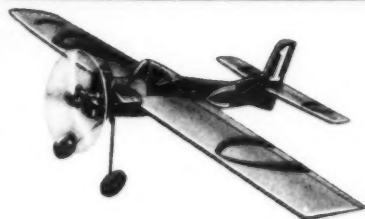
MOVABLE FLAPS



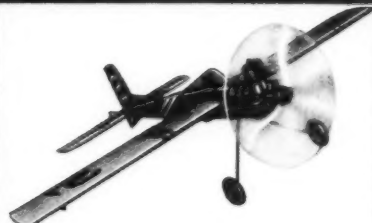
BARNSTORMER MARK 2 U-control stunt model. 47" wing span, wing area 470 sq. in., Engine .19 to .36. \$7.95



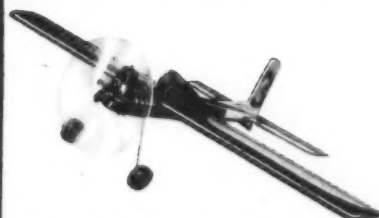
BABY BARNSTORMER 1/2 A U-control stunt. Wing span 23 1/2". Wing area 118 sq. in., Engine .035 to .049. \$3.25



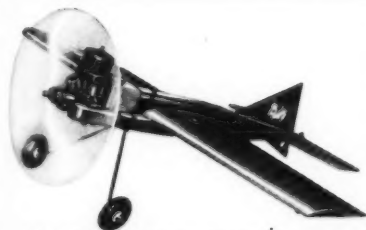
PROFILE TRAINER 1 Ideal control line model for small engines from .049 to .099. 24" wing span. \$3.25



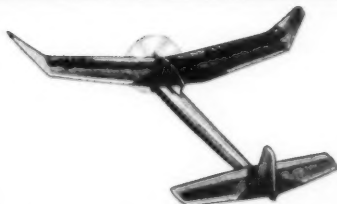
PROFILE TRAINER 2 30" wing span U-control model for engines from .14 to .19. Rugged — dependable. \$4.50



PROFILE TRAINER 3 Giant 36" wing span U-control trainer for engines from .19 to .36. Best value. \$5.95



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ture IF cans? Milo Trading Corp., 215 Fulton street, New York 7, N.Y. has two sets, both priced at 69 cents per transformer. The TR-102 and TR-103 are 1st and 2nd stage units, measuring $\frac{1}{2}$ " square by $\frac{1}{2}$ " high. Other small units are the PV-103 and PV-104, designed especially for a Poly-Vari-Con variable capacitor. Sub-miniature transformers, for transistor applications are also 69 cents and sub-miniature pots, with and without switches are 59 and 49 cents respectively. Battery chargers for 45 and 67 $\frac{1}{2}$ v receiver and transmitter batteries are \$2.19 and are merely plugged into the 110v outlet. Items listed in the Milo 1958-59 Fall flyer.

The P. R. Mallory Co., announces their new steel-jacketed size D cell. Said to stand up under severe conditions of heat and humidity, this cell is recommended where long life and reliability are desired. See your radio dealer who carries Mallory parts.

Polk's Modelcraft Hobbies, 314 Fifth Avenue, New York, N.Y., has two new receivers and an addition to their MOPA transmitter. The first receiver, the Aristo-X is a single hard tube plus two transistor job which weighs about 1.5 ounces and measures 15/16" x 1-7/16" x 2-5/16". One pencil is sufficient for several hours for the A supply and a sub-miniature 22 $\frac{1}{2}$ volt battery is used for the B supply. No signal current is about .4ma and the relay current goes from near zero to 4.5ma upon receipt of a signal. This is a carrier-operated receiver, suitable for $\frac{1}{4}$ A RC ships. Price ready built is \$19.95, \$15.95 for the kit. The second receiver complete or as kit, is the Aristo-Tone, slightly larger in size weighing about two ounces. This is a new type tone circuit with low current drains. The Aristo-MOPA transmitter can be converted to a tone transmitter for use with this receiver by adding a modulator deck to the present printed wiring chassis.

Also from Polk's is the new Elmic Conquest escapement, model 4P-SN. This English unit comes complete with spanner wrenches for installation adjustments, escapement couplings built-in, linkage and a nylon pawl for \$5.95. Operating with $\frac{1}{4}$ " to $\frac{1}{2}$ " rubber, on from three to six volts, this escapement is ideal for engine speed control. An eight ohm coil affords low current drains.

Lafayette Radio, 100 Sixth Avenue, NYC has a small fibreglass kit for \$1.36. Known as the BASH kit, it contains resin, hardener, fibreglass cloth and a spatula for application. This is a small kit but sufficient for doing the nose of large models, boat prows or decks and even for field repairs. Field repairs can sometimes be done on a hot day if the amount of hardener is doubled.

For those of you who want to design compact transistorized power supplies, don't overlook the new silicon rectifiers by Texas Instruments. Rated at 750ma, they are available in three sizes; 200, 400 and 600 peak inverse voltage. Being a silicon device there is no need to worry about ambient or high operating temperatures, since they are good up to 212 degrees F. The size is .200" diameter by $\frac{1}{4}$ " long, with axial leads. Type 1N2069 (200v) is \$1.15, 1N2070 (400v) is \$1.40, and 1N2071 is \$1.80 in small quantities. The price is not much more than you would pay for a selenium rectifier which would be much much larger in size. We think you'll be hearing about and using silicon rectifiers in the near future. Any dealer handling Texas Instrument components stocks these units. In the NYC area they can be obtained from

Milgray Electronics, 136 Liberty Street.

The Philco Corp., Lansdale Tube Company Division, Lansdale, Pa., has announced a family of low cost, medium power alloy junction transistors. Ranging in price from 95 cents to \$2.40, these transistors have a peak collector current of $\frac{1}{2}$ amp, a higher than usual Beta figure for low priced transistors and a higher working voltage. Frequency response limits them to audio work. Applications are for switching and servo use and they may be obtained from your local Philco Industrial Semiconductor Distributor. The types are 2N1124 through 2N1130. Prices apply to quantities of 1-99.

The Centralab company has a new sub-miniature pot measuring but .286" in diameter. Available in 500 ohm to 10 megohm ranges it can also be supplied with a SPST switch. The subminiature job is Model 8 and is rated at the same wattage as the familiar larger Centralab miniature pot, 1/10 watt. In between this one and their regular Model 1, measuring $\frac{1}{2}$ " diameter, they have a new Model 6 measuring $\frac{1}{4}$ " in diameter. To further illustrate the size of these units, the familiar $\frac{1}{4}$ " diameter unit presents a component density of 9 per cubic inch while Model 8 is good for 158 per cubic inch. The announcement was too late to get prices and availability.

New Look in Batteries

(Continued from page 50)

made from thin micarta, 1/16" plywood, breakfast cereal box cardboard, or any similar insulating material. The top, bottom, and insulator are all made from the same outline.

Lay out a rectangle 3 $\frac{3}{4}$ " x 1 $\frac{1}{2}$ " (for VO-500's and VO-250's). Draw in diagonals. Locate four holes ($\frac{1}{8}$ " diameter) $\frac{1}{8}$ " in on the diagonal from each corner. Locate a fifth hole ($\frac{1}{8}$ " diameter) at the intersection of the diagonals. These holes are for the five through-bolts. The holes for rivet contacts are located 7/8" from the intersection of the diagonals on a line parallel to the long side of the holder passing through the diagonal intersection. This is roughly the center of each end. Six copper or brass rivets are required, two each for the top, insulator and bottom. Although rivets are available at almost any hardware store, a suitable substitute would be a U-shaped piece of thin brass inserted through a slot cut where the rivet holes would be drilled. One other hole, which serves as a lead-out for the common battery wire, is located 3/8" to the side of the center through-bolt hole.

Saw out the outlines and drill the eight holes in the top, bottom, and insulator. Pound in the two rivets on each part. Solder a length of #22 stranded red wire to the outside of one rivet on the top board, and a length of #22 stranded black wire to the other rivet. Connect the two rivets of the bottom board together on the outside with #22 stranded white wire and solder an additional length of this same wire to either rivet. Insert five 1" 4-40 screws with washers through the bottom board and slide 3/8" lengths of 1/4" surgical tubing over each screw. Lay the lower two batteries in place, positive faces electrically toward the red wire, and negative faces electrically toward the black (series). Slip on the insulator board and five more 3/8" lengths of 1/4" surgical tubing over the screws. Lay on the top two batteries in the same manner as the bottom two. Install the top board with five blind nuts and tighten securely. Thread the

(Continued on page 54)

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Fireboat

(Continued from page 21)

the plywood mounts and cement this assembly to the hull after the plastic tubing has been firmly fastened to the pump.

The remainder of the hull now can be covered with $\frac{1}{8}$ " sheet balsa. The grain should run lengthwise, except at the bow and stern where the grain must run vertically in order to negotiate the sharp curvature. Sand this well when dry. Notice that the side covering extends above the main deck to form a coaming or bulwark all around the ship. Add the side bumpers now.

Bend the propeller guards to shape and drill a small hole for the rudder tiller. Solder the brass braces to the guards and then slip the forward end of the guards into the hull and cement firmly.

Add the main deck coaming along the wheel house opening. This prevents the house from shifting and keeps water out of the hull if a wave breaks over the deck. Seal this opening with tape at this time to keep the hull interior free from dust.

Sand the hull with fine sandpaper and apply several coats of sanding sealer to the entire hull exterior. Sand well and repeat several times until the hull is smooth and all grain lines are sealed. Wet 8/0 sandpaper should be used to sand the model prior to painting. Color the hull as the plans indicate. Always apply the light colors first followed by those that are progressively darker. The sealing of the hull of a boat is very important, therefore use plenty of sealer to insure a truly waterproof hull.

The wheel house is easily made from sheet balsa because all sides are flat and do not require bending. Sand this well, then seal and paint the colors shown on the plans.

Our model is now fitted with a water tank which supplies the firepump. We originally took the water for the pump directly from the lake through the side of the hull; however, it was found that leaves, slime, algae, and other debris was always clogging the suction pipe. With the present arrangement, there is no chance of clogging. The tank is made from a frozen fruit juice can and is firmly mounted in the wheelhouse. Solder three short lengths of brass tubing to the can; filling, vent and feed connection. This can be filled via the house top without removing the wheelhouse.

Install the receiver, wiring, batteries, sequence relay etc. to complete the hull interior.

Many of the deck fittings such as; bits, cleats, anchors, life preservers, searchlights etc. can be purchased in cast metal form at many of the better hobby shops. These should be painted before they are cemented in place. The monitors are made from dowel, wrapped with strips of tape and plastic tubing, [except for the forward-most monitor which is made from brass tubing] and plastic tubing (fuel line). The large firehose reels on the after deck are built up from a frame of sheet balsa and dowel which is wrapped with plastic tubing (fuel line) to resemble the hose. The railings at the bow and stern are optional as well as the stanchions and chain along the sides of the deck, Ladders, smokepipe, etc. are made separately and painted before they are cemented in place.

The mast is attached to the wheelhouse and not to the deck. Our mast serves as the antennae on the prototype model.

Check the model for proper trim in the bathtub and add lead weight to the bottom of the hull interior to balance the model [evenly in the water. Correct balance is important for proper handling] as well as appearance.

Try to operate the model in relatively clear water free of weeds which could snag the propellers and cause the model to drift helplessly. The propeller guards on the prototype model restrict this possibility; however, it has happened to us with disastrous results.

(The author expresses appreciation to Mr. Robert H. Metzgar of the Port of Long Beach Harbor Commissioners for his kind and generous cooperation that made this article possible.)

New Look in Batteries

(Continued from page 52)

white wire on the bottom up through the lead-out holes, and twist the red, white, and black wires together.

The batteries should be all in series, positive at the red wire, negative at the black wire, and center-taped with the white wire. This is the normal servo battery hook-up. Cement the wiring to the boards adjacent to all soldered connections to prevent vibration fatigue. The whole works may now be mounted on 3/8" of foam rubber and strapped into the bottom of the model with rubber bands.

The other holder shown is for mounting two VO-250's directly on the cover of a 3-volt receiver. The batteries are wired to power both the receiver and escapement, and the holder and batteries weigh 1 1/2 oz. complete. It is made like one-half of the foregoing holder. VO-800's may be installed quite simply by bolting them vertically against a bulkhead with a light sheet metal bracket type strap, and thin foam rubber.

Charging VO series batteries is much easier than charging dry cells. Two simple precautions must be observed: Don't charge them backwards and don't charge any

above their rated charge currents. Gassing in both cases will supply result, ruining the batteries.

It is not necessary to remove the batteries from the model to charge them. Simply make a convenient place to clip charger leads onto the red and black wires of the holder mentioned earlier. These same leads as well as the common, may be left connected to the servos during the charge, since the servo circuit is open due to neutralizing switches and relays. The same thing applies to the single channel set-up also shown.

Connect the charger's positive terminal to the batteries' positive terminal and the charger's negative terminal to the batteries' negative terminal. The positive terminal of a button cell is indicated by a plus sign stamped on the face; the negative terminal is the back case. The plus and minus terminals of the VO-800 are indicated by red and black dots, respectively. If in doubt which charger terminal is positive or negative, connect a voltmeter across the charger. When the voltmeter is connected such that it reads normally upscale, the voltmeter's positive lead indicates the charger's positive lead and the voltmeter's negative lead indicates the charger's negative lead.

Many home meters are seriously in error. If the meter is not absolutely known to be accurate to 2%, do not charge at the maximum charge rates given. These rates are listed in the Battery Spec Chart of Part 1. The use of the recommended charge rates and times also shown on the chart is strongly advised. This is especially true if constriction type holders are not being used. This reduction in charge rate gives a good safety margin both for inaccurate meters and poor charger regulation.

In order to determine the minimum time for full charge at any specific charge rate, reference must be made to the Battery Specifications Chart. Under Charge Time a formula is given for each battery. Using the VO-500 as an example, the formula (Continued on page 62)

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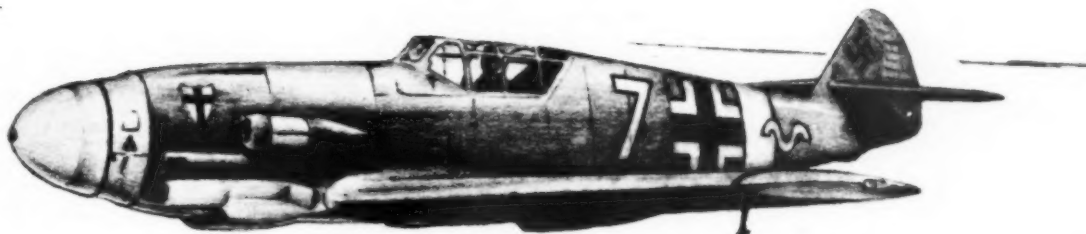
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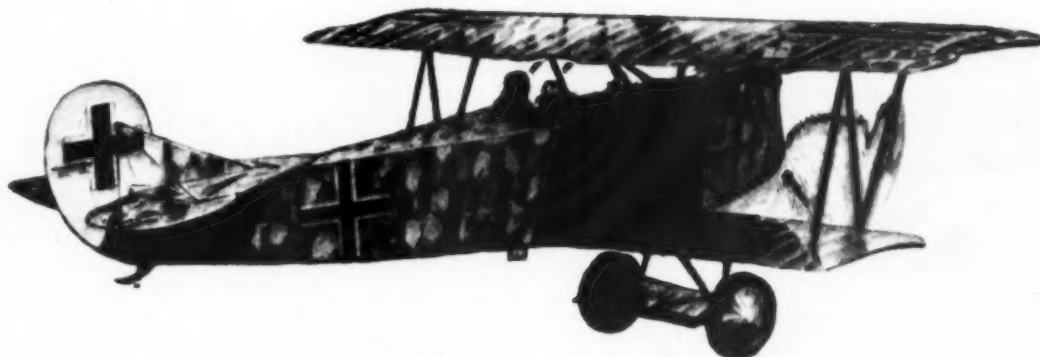
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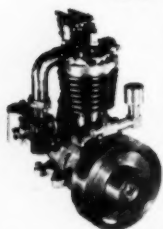


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Com-Bat

(Continued from page 14)

for the trailing edge. This makes for a strong intersection with the wing and fuselage. The 1/4" plywood bellcrank door is cemented firmly to 1/16" hard sheet balsa. The bellcrank is in turn bolted securely to this 1/4" plywood. A J. Roberts control unit was used on the original to provide variable engine speed. Full details are provided with each unit. For engines not utilizing a variable speed carburetor, use the slide exhaust restrictor type as explained with each J. Roberts control unit. If engine control is not desired, merely use a Veco or similar bellcrank.

Now, mount the wing in the fuselage slot. This should be a firm fit. Use several coats of cement for this job. Next, cut a slot in the wing for the tank and then mount the tank permanently. If you have a longer tank than shown on the plans, you will have to beef up the wing at this tank because too large a slot will have been cut from the wing spar. Carve a slot in the outside wing tip for a 2 oz. lead weight.

The flipper is cut from 3/16" medium sheet. Use quarter-grain stock to prevent warping. Ka-Pak fabric sewed hinges were used on the original Com-Bat; however, any good commercial hinges will work just fine. Use a good metal control horn with holes for three positions such as Veco. Connect the bellcrank and control horn with a 1/16" pushrod. Use 1/8" tubing where the pushrod runs out of the wing. The flipper should have 45 degrees movement; however, 30 degrees is plenty for initial testing. Use stranded-wire wing leadouts.

The rudder is cut from 3/32" plywood, using a coping saw. The rudder should have 1/2" out-rudder at the base. Anchor the rudder down into the fuselage as shown on the plans. Cut a small hole to mount the streamer.

A 2" dia. metal spinner was used on the original but this is optional. The cowl used on the original is also optional. If you decide on a cowl, make the left side from 1/4" sheet. The right side of the cowl is carved and hollowed from a block 4 1/2" x 1 1/2" x 2 1/2". From the leading edge back, the cowl right side is faired into the wing and fuselage with balsa scraps. The cowl on the original is not removable so the mounting bolts were soldered and the fuel line connections were wrapped securely with fine wire. The right side of the cowl may easily be made removable, however. Because this model has no gear, a 3/32" wire skid is used for the belly. Make a tail skid from 1/16" piano wire.

ABOUT FULL SIZE PLANS

So many readers have inquired about old full-size plans no longer advertised, that we've prepared the following list of remnants still available at 25 cents per plan set:

Daredevil, 1/4A, FF; Wrangler, Tm. Race. Pelican, 1/4A, FF; Winnie Mae, 1/4A, U/C. Boulder, 29 Spd.; Zephyr, 1/4A, FF. Hotter'n That, Comb.; Super Saucer, Tow-L. Snapper, 1/4A, St.; Dieselaire, 1/4A, FF. Sidewinder, 1/4A, U/C; Long Tom, .19 FF. Sky Wing, 1/4A, FF; Challenger, Tm. Race. Zilch, .29-.35 St.; Faison, .15, FF. Beaver, .19-.35 U/C; Zenith, A-FF. Kingfisher, .35 U/C; Half Wave 1/4A, RC. Maybe, .09 FF; Scrambler, Tm. Race. At 50 cents: Acrobat, CQ; .15-.19 RC's. At \$1: Wylam Ford Trimotor, 4 plates.

Finishing and testing: Covering and finish is pretty much a matter of personal preference. The wing on the original was covered with silk and the balance was covered with light Silkspar. The finish consisted of three thin coats of clear and trimmed with white and black hot fuel-proof dope.

Before flying, use lead if necessary to balance the model 1 1/2" from the leading edge. Next check your control. The flipper should not be at full up or down position until your handle is at full up or down position. Move the pushrod to different holes in the control until this situation is attained. This is extremely important. Flying wings are stable and easy to fly if the center of gravity is in the correct position and if the control movement is not erratic. If you do not pay strict attention to these two points, you will have junk.

Select a calm day for initial test flying. From there on, your success with your Com-Bat will depend upon constant practice-practice-practice in all kinds of weather. Here's wishing you the very best of luck.

The Hand Launched Glider (Continued from page 17)

wood. Nicks and varying hardness can be tolerated to a small extent, especially in heavier outdoor gliders but under no circumstances should a twisted piece of wood be used for any part of the glider, wing, tail or body.

I feel that too much emphasis has been placed upon the desirability of using quarter-grained wood in glider wings and tails. In this present day and age just about any piece of wood which is light and warp-free is a good piece, regardless of grain. However, if you should have a choice between equally good pieces of quarter-grain and tangent-grain wood, take them both and treat the quarter-grain piece as slightly better.

In selecting wood for the body there are no rules which can be rigidly followed. Most good body stock is seven- to ten-pound density and straight grained. When in doubt use the hardest piece. The body will contribute only slightly to the final weight of the glider and its strength is vital. On many outdoor gliders I prefer to use basswood to gain additional strength but on an indoor glider only balsa, carefully selected, will do.

So much for the materials. The next step is selecting a proper design. Good design is based on many factors, the size of the flier and his throwing ability, the flying site, indoors or out, low ceiling or high and the size of the field. Important, too, is the purpose of the glider, there being a great difference between a glider of contest winning caliber and one intended to provide a few hours fun in the afternoon at the local baseball diamond. I shall assume you are more interested in a glider for contest flying. In any event, all of the following is every bit as applicable to sport flying as to contest flying.

Those of us who are possessed of good throwing arms usually settle upon models from 50 to 70 square inches of wing area, while the less muscular modelers build models as small as 30 square inches area and as large as 100 square inches. As a starter, I would recommend a glider of about 50 square inches of wing area for either indoor or outdoor flying. If the indoor site has a low ceiling or is small in floor area, a slightly smaller model might be better. The chart in figure 1.3 shows recommended wing areas for various ceiling heights and for outdoor use (in general any size model recommended for indoor

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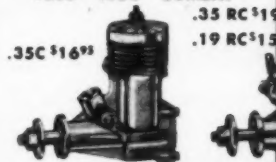
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use over 90 feet is suitable for outdoor use). The newcomer to glider flying is advised to keep his wing area close to the values on the center curve in figure 1.3 when designing his first few gliders.

It would be well to consider the desired weight of the model at this time in order to be able to select the wood and to permit the builder to fix a goal in his mind to guide him in construction and finishing. The charts show the ratio of desired weight to wing area for indoor gliders (figure 1.4) and the ratio of desired weight to wing area for outdoor gliders (figure 1.5). For the sake of durability, beginners are advised to stay toward the high side of the central area and those modelers desiring higher performance trim the weight toward the low side of the chart.

Stabilizer area and moment arm must vary to suit the individual. In general a wide variation in both is to be found in common use, areas as small as 20% of wing area and as large as 40%. A stabilizer area of about 30% should prove satisfactory as a starter for either indoor or outdoor use and few builders will find it necessary to change from this size to gain better performance. For your first attempts, a stabilizer moment arm of about three wing chords, measured from the mid-point of the wing chord to the mid-point of the stabilizer chord, will suffice. Some alteration in this length may be needed in future models but, for the first few, no change in either area or moment arm length should be made.

Longitudinal stability is determined by the angles of incidence of the wing and stabilizer. The glider (or any other airplane, for that matter) owes its ability to fly right-side-up to the fact that the increased speed of a dive causes the wing to generate lift and raise the nose, and the decreased speed of a stall causes the wing to lose lift and lower the nose. Therefore, the stabilizer should never be permitted to outlift the wing or to stall before the wing does. This can be accomplished by careful assembly of the wing and stabilizer to the body and careful cutting of the body so that the wing and stabilizer have the same angle of incidence.

Figure 1.8 shows the three possible combinations of incidence set-up. The "zero-zero" set-up is the one for which the builder should strive. The set-up in figure 1.8a is safe but not desirable as it gives the glider a considerable looping tendency which causes grave problems in launching and control. In Part IV some mention will be made of the uses of positive stabilizer incidence (figure 1.8c) but for the present, let it be said that such a set-up can be disastrous and should not be used.

Rudder area is a strange factor in a glider's stability; it is critical and can best be determined by starting with a rudder of about 8% of the wing area and then cutting off or relocating small amounts of area while studying the effects of these changes in the model's stability. Rudder area works hand in glove with dihedral in making a glider laterally and directionally stable, and both are important, especially in outdoor gliders where turbulence in the air presents a considerable upsetting force for the glider to overcome. A simple means of determining the minimum total dihedral required for a given glider is to multiply the wing span by the factor given in figure 1.7. For wings with an aspect ratio of greater than 7:1, the dihedral factor may be slightly decreased.

A quick look around any glider contest should convince anyone that the actual shape of wing and tail surfaces may vary greatly. Curved outline or square or tapered matters little, aspect ratio (the ratio of wing span to mean chord) is only

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slightly more important. The principal factors are the distribution of wing and stabilizer area, the rudder area, the amount of dihedral and the wing and stabilizer incidence.

Plans are shown in figure 1.6 of a typical glider. This particular design has proven to be a very good flier both indoors and outdoors in the hands of many modelers. It twice won the open indoor glider event at the Nationals and has done as high as 1 minute, 13.6 seconds in the Lakehurst N.A.S. blimp hangar. All the dimensions given may be scaled down to $\frac{3}{4}$ size to obtain a 36 square inch area glider suitable for low ceiling indoor flying or outdoor sport flying.

The above information should permit the reader to dabble experimentally in hand-launched gliders, but there is much more still to be covered in the following parts concerning construction, finish, flying and advanced design, along with plans for other gliders and the "secret" of launching a hand-launched glider.

1959 INTERNATIONAL TEAM SELECTIONS

The first step toward selection of the USA World Championships teams for the three Free-Flight events, Power, Nordic, and Wakefield, will take place June 13-14, the dates for local eliminations to qualify entrants for the semi-finals. All the "elims" will be held on this weekend throughout the country. Approximately 25 cities and areas will stage these local elims as follows:

EAST: Baltimore, Md.; Boston, Mass.; Cleveland, O.; Knoxville, Tenn.; Miami, Fla.; Norfolk, Va.; New York-Philadelphia; Watertown, N.Y.;

CENTRAL: Bloomington, Ind.; Chicago, Ill.; Dallas-Ft. Worth, Tex.; Detroit, Mich.; Galesburg, Ill.; Kansas City, Mo.; Minneapolis, Minn.; Omaha, Nebr.; Tulsa, Okla.; Wichita, Kan.

WEST: Denver, Col.; Los Angeles, Calif.; Marysville, Calif.; Phoenix, Ariz.; Salt Lake City, Utah; Santa Barbara, Calif.; Seattle, Wash.;

All the local elims will be flown over the two-day weekend. One event will be flown Saturday, one on Sunday, and the remaining event will be split over both days. Local Contest Directors will determine which event will be flown which day. Local conditions and popularity of different events may vary from area to area, so what one elims may be doing does not necessarily apply to the others.

This magazine and AMA's Model Aviation will publish shortly a list of Contest Directors to contact for local information, such as location of field, time schedule, and schedule of events. Rules and specifications for three classes of models can be found in the latest edition of the AMA Rule book.

SEMI-FINALS

These will be held on June 27-28. Semi-final entrants will be only those who have qualified at the local eliminations.

LOWER QUALIFYING TIMES: Qualifying times for all three events have been lowered. To qualify for semi-final competition one must have a five-flight total time of at least 10 minutes for Nordic, and 11 minutes for Wakefield and Power.

One reason for the lower qualifying times is that this year the contest will be flown at a time of year when the air is apt to be turbulent, rough, unsettled, or just plain bad. It is also reasonable to assume that with lower qualifying times more people will fly in the semi-finals, and it also will be an aid to those who may have a bit of bad luck. To insure a mini-

(Continued on page 61)

STUNT MAN 23

FOR .049 TO .09 GAS ENGINES



EXCITING NEW
STUNT MODEL BY
Carl Goldberg

23-1/2" WINGSPAN
DIE-CUT INTERLOCKING
ALL BALSA CONSTRUCTION

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Dear Modeler:

Want a plane that can REALLY STUNT - but tough enough to let you learn the ropes? A plane that isn't too hard to build? Here it is - the brand new Stunt Man 23 - a real hair-raiser for thrills - yet so simple and rugged that you can fix any damage with a tube of cement! It's a bigger, stunt plane, based on my popular Swordsman 18 and will give you more action and advance your flying skill. Great with 1/2A engines, and really tops with .09s. Wingspan 23-1/2", length 16-1/2". Fully prefab construction (no paper), with all die-cut interlocking balsa and plywood parts, formed landing gear and tail gear, rubber main wheels and tail wheel, screws, washers, controls, large colorful decals, clear plastic canopy, nylon for hinges and reinforcing, and the finest illustrated step-by-step plans. PLUS - a full picture guide - "Learning How To Stunt"! See your dealer, he's getting Stunt Man kits to help you get into the fun of stunting for only \$1.95.



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SPACE JET 21—Die-cut balsa, 21" span, 0.020-.049 engine. \$1.69



SWORDSMAN 18—Die-cut balsa, 18" span, for .020-.049 engine. \$1.49.



1/2 A BLAZER—Die-cut balsa, tissue, 40" span, for .049 engine. \$2.50



RANGER 28—My "pre-fab plus paper", 28" span, 2 colors \$1.00



SHOESTRING RACER—18" span. All die-cut balsa. Complete \$1.00



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RANGER 21—All die-cut balsa parts, 21" span beauty. \$1.00



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Complete Listing

MODEL AIRPLANE NEWS FULL SIZE PLAN SERVICE

The editor's selection of all time favorites, including completely new combinations of the greatest designs. All types! PLAN SETS 50c p.p.

PLAN OF THE MONTH

57.

Twin Lizzie: 1/2A FF.
Com-Bat: U/C, .29-.35.
Fireboat: Marine, RC.
T-Liz, a cute sport job.
The boat, Musciano, a beaut.

4.

SURE FUN: UC Sport, .29-.35
PROFILE SILVAIRE: FF Profile, 1/2A.
ZEPHYR: Rubber, Fuselage
Control line on floats. Sport Gassie.

6.

FOKKER D7: Scale, U/C, .29-.51.
The great all-time favorite?
Try the Fokker D-7.

7.

WORLD CHAMP GL.: Nordic Winner.
HI BOY: Cabin Stunt, Palmer-
Goyat, .29-.35
POW WOW: Bob Palmer stunt, .29-.35
Collector's Item—two Palmer models!

8.

GEE BEE: Scale U/C, .19-.25.
DRAKE: FF, flying boat, .049.
DURANITA: FF, biplane, .049.
More people built the Drake
than any other ship.

9.

AEROCOM'DER: Scale, U/C, 2 .15.
MARS: Bob Palmer stunt, .29-.35.
NOBLER: Aldrich's Nats Winner,
Stunt, .29-.35. Palmer and Aldrich,
plus a twin ukie. Imagine!

10.

SMOG HOG: Bonner's Multi RC, .19-.35.
STRATOLINER: 2 Half A, U/C.
GUARDIAN: U/C Scale, .29 up.
Greatest Multi RC of all time—a beauty!

11.

GAMBLER: Mirror Stunt Winner, .29-.35.
DOUGLAS B-66: ducted fan FF, .049.
B-66, the ducted fan job that
beats all others.

12.

WHIRLING WINGS: Sikorsky XH-5,
.15, 'copter.
BREEZY: Small field RC, .049.
SPITFIRE: Stunt, semi-scale, .29-.35.
P. Schoenky, 'copter master—his Sikorsky!

13.

T-CRAFT: FF scale, .049.
FENO: Combat, stunt, .29-.35.
PADDY'S WAGON: Contest FF, .049.
Paddy's Wagon—one contest
job ok for beginner.

14.

HEATH PARASOL: RC, FF, Scale,
.075 .09.
GUARDIAN: Nats carrier winner, .29's.
SHARPIE: FF Sport, .02-.049.
—Guardian a dilly.

15.

RE-8 WW1, U/C, .29-.35.
FLAPPING WINGS: Rubber,
ornithopter.
BOOMER: FF, sport, pusher, .049.
Can planes fly like birds?
Ornithopter sure does.

18.

PAACKHORSE: PAA Load FF .15.
AIRNOCKER: Scale, FF .049.
What model hit the jackpot?
Airknocker—the Champ.

27.

FLAMINGO: RC Amphibian, .15-.23.
UPSTART: Best B-C FF, on .29-.35.
NACA planing hull make Flamingo
stand-out RC. UPstart—it goes!

40.

MUSTANG: U/C Scale, .29.
BI-GONE: Sport, FF, 1/2A.
GLIDERS FIVE: HL Sheet.
Mustang, Jim McCroskey's Nats
winner. Bi-Gone, nifty biplane.

43.

EQUALIZER: .15 to .19 multi, RC.
QUICKIE-TRAINER: Speed, .29.
AMAZOOM: FF, contest, .15.
deBolt's best, the Equalizer?
Amazoom—Stan Hill's hi-thrust.

44.

CONVAIR'S DELTA: Jetex FF.
LIL DYNAMITE: .15 stunt, UC.
SWAT: 1/2A, FF, contest.
A trio of exceptional planes.

45.

ASTRO-HOG: Multi RC, .29-.35
MITCHELL: Profile, .09's, .15's UC.
Dunn's low wing radio—tops!
Nothing matches this multi.
The Mitchell a fine flier.

46.

PROJET B-47D: U/C, .15's.
RUFFY: Stunt, .29-.35.
NOR'EAST'ER: Nordic glider.
B-47D, beaut of a project
Ruffy: big winner—it's new!

47.

FOKKER E-3: 1/2A, FF, Scale.
NAVY RACER: Rubber, semi-scale.
WOODY: .29-.35, UC Combat. Hott
E-3, beautiful model, fine flier.

48.

SPORTCOUPE: .09, U/C, Stunt.
WHATIZIT: .35, Combat, Wooten.
SWIF-F-FT: Jetex, two sizes!
Whatizit, settles fuse-wing debate!

49.

CONQUISTADOR: .29-.35, U/C
Stunt.
TWO-STAGE ROCKET: Jetex (2).
Stunter is a thing of beauty, and
it flies as well as it looks!

50.

DUMBO: PBV Scale, U/C, .19's.
FRENCH OLDTIMER: 1914, 1/2A, FF.
Dumbo, the Catalina, man-sized
ukie, takes off, lands on water
or ground.

51.

AMERICANO: .15 FF, by Blanchard.
BOMARC: Scale, Jetex, missile.
CUTLASS: Sport U/C, .049's.
Scorpion power makes Bomarc ter-
rific flier. Americano is National
Champ's very latest.

52.

GAUCHO: RC Stunt, .29-.35.
THE CHAMP: Best U.S. Wakefield.
LAIRD SOLUTION: U/C Scale, .15-.23.

53.

Gaicho, Argentine Champ, does pattern
inverted. Champ, a single Wakefield!
SNAP: Sport U/C, .19-.23.
PELICAN: PAA Cargo, .049.
WINDMILL: FF, 'gira, .02-.049.
For proto take-off and landing
realistic Snap tops 'em all. Other
two, collector's items.

54.

SATELLITE: Hunter's FF, .19-.35.
SUPERMARINE S-6B: U/C Scale,
.09-.15. Satellite is top contest free
flight '58-'59. Schneider racer, S-
6B seaplane is one of FAST club's
best projects.

55.

DETROIT STUNTER: U/C .29-.35.
HORNET MOTH: FF, Scale, .02-.049.
THE BARDON: Wakefield.
D'trait St.: McDonald's Strathmoor,
Nats favorite. Bardon: Canadian
and US Nats winner, tops in rubber.

56.

RYAN PT-22: U/C, .19-.25.
SNIPE: Gurnett's Nordic.
Lovely scale job, that PT, with
workable flaps, throttle.
Taw-line glider long, strong
wing, right sections, etc.

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- Humdinger, Old Faithful, Cessna 180
- Aero Bat, Snoopy, Seagull
- Corsair, Gyro-Glider, Santanita
- Cougar, '55 Nordic Winner, Dizzy Boy
- Great Lakes Trainer, Triple Threat RC
- Mig-15, Finella, Coquette
- Skyraider, Dunwoody's Nordic, Flexi-Bull-It
- Corben Super Ace, Cessna 310, Profile Lightning

MODEL AIRPLANE NEWS • April, 1959

Bulletin Board

► Mailbag for the BULLETIN BOARD this month contained no less than ten different bulletins, newsletters, annual reports, etc., of different clubs and groups across the U.S. and Canada. All are good reading, interesting and contain plenty of info.

Such as banquets, annual social gatherings and the like reported from Montreal (MMFC), Connecticut (CCAMA), Hamilton, Ont. (HAMA), Cleveland (Flite-Masters), and New York (GNYIC). Most of these include annual award ceremonies and many have interesting guest speakers. All of them are fun for all. Why not think over this idea for your club?

Such as plans for successful contest crates: from Vancouver, B.C. (VGMC) with a 1/2 Gas Job and from Montreal (MMFC again) with a light weight rubber job and an "unlimited" .15 free flight.

Such as planning for the Tulsa Club Dobbers Tenth Annual Meet, scheduled for July 3, 4, and 5, 1959, in which they are rolling up all the meets they hold every year into one—and then adding some. Interested modelers in that part of the country should check up on this one by writing the Dobbers at 444 So. 93rd Place E., Tulsa, Okla.

Such as the fact that the University of Minnesota has made its Field House available for indoor flying every Sunday—both regular indoor events and control line (30-ft. lines, .15 max., engines). This from "Let's Go" of the Minneapolis Model Aero Club.

Such as the Annual Report of the Western Associated Modelers, 12 pages giving a complete rundown on activities during the entire year of 1958.

Such as the special classes in all phases of modeling reported in "The Dope Can" (Ravin Cajuns of New Orleans). These fellows really want to develop latent talent.

Such as the four-page printed (not mimeographed!) report on the Eastern Canada Open meet. Complete with photographs, this is the best report on a model meet we've ever seen outside of a regular model magazine. And it was all done after the meet when most outfits that run meets quietly retire until next year.

We're sorry BULLETIN BOARD doesn't have enough space to cover every one in detail, but the ideas are there and every one of them can be picked up and used by other clubs in other places to make this hobby more fun. Annual banquets and award dinners, technical info for the experts and for the beginners, special classes in model building, cooperation from a university, a detailed annual report and a detailed contest report. Why don't you bring up some of these ideas at your next club meeting?

► Also received a letter from the New York Aero Club, which has recently joined the Greater New York Interclub Association. NYAC is now looking for interested beginners who want to learn how to build and fly contest free-flight gas and non-gas

powered models. Seems they want to build themselves a team. Contact man is John Giovine, 1009 Morris Ave., Bronx 56, N.Y. The club meets at his home on the first and third Fridays of every month.

► Russ Scheidter tells us that the Minneapolis Model Aero Club ran its first combined FAI event (FAI Gas, Wakefield and Nordic) on Dec. 20. Apparently they only fly three flights, for Russ says first was three maxes. He admits that winner Bud Cornelius had thermal help. All in all it's a thoroughly normal contest report—except for one thing: Temperature was 12 degrees!

► K & B Allyn Co. announces a new .45 cu. in. engine in two versions: one for RC, and one for control line and free flight. Former sells for \$27.95 with exhaust throttle linked to two-speed needle valve assembly; latter, without these gadgets, is \$19.95. Unusual is the "rear counter balancing fly-wheel" (patent applied for) which is claimed to provide exceptional smoothness, lower bearing wear and more power.

► American Junior Aircraft Co. offers a new ready-to-fly control line job under the name "Firebrat." Comes with a Fox .15 for \$13.95; ready-to-go, less engine, tank and prop for \$6.95; or, as a prefab kit less engine, tank and prop, for \$4.95.

► Carl Goldberg Models, Inc., has a new 1/4A, swept-wing, all balsa, tricycle gear control liner called the "Space Jet" for \$1.69.

► Ohlsson Manufacturing Co. has a new gadget on the market—repeat, new. It's a device you attach to your booster battery that enables you to check your glow plug without removing the plug. With the works hooked up, you just push a button—if the bulb lights, plug's okay; if it only glows dimly, battery's low; if it's a total blackout, either plug or battery is kaput. Sells for \$1.49.

► Busiest guy in the trade has apparently been Roy Cox of L.M. Cox Mfg. Co., Inc. Item No. 1 is a ready-to-fly plastic P-40 with a special engine not elsewhere available. Span is 20 inches and the color scheme is straight from the Flying Tigers. Price is \$10.00. Items No. 2, 3 and 4 are three new engines, as follows:

For \$6.98, the Space Hopper .049. Resembles earlier Cox engines except that crankcase is more compact (we aren't sure what he did with the reed assembly, but it doesn't bulge the bottom of the crankcase). Also has beam mounting lugs with special adapter for firewall mounting.

For \$7.98, the Sportsman .15. Looks like a blow-up of the .049 with a bore of .585 inch and stroke of .556 inch.

And for \$12.98, the Olympic .15. Quite similar to Sportsman except double ball bearing crankshaft and, according to Cox, extra precise piston and cylinder fit.

SATELLITE CORRECTION

The designer's original pencils were made 80% full-size "800" model. Draftsman noted departure after finals done. MAN full-size plan "600" was to be enlarged 1/16th by plan printer, from wrong-sized 800 plan. This enlargement actually was only 1/20. Hunter advises plans perfect for .19-.23, slightly hot for a .29-.35. Suggests deepening fuselage to 2% in. at front, tapering bottom accordingly, to fit timer tank.

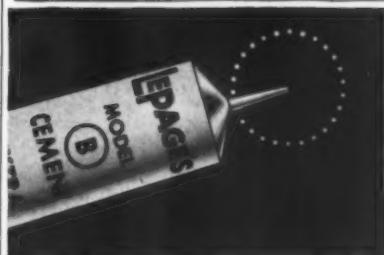
The 1959-'60 rules specify FAI power loadings so smaller engines required anyway.

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Metuchen, N. J. © L'59

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7-4	7-6		40¢
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9-4	9-6	9-7	9-8
10-4	10-6		85¢
11-4	11-6		\$1

2 Blade Pusher

5 1/2-3	5 1/2-4	
6-3	6-4	25¢
8-6		85¢
9-6	10-6	\$1

3 Blade Tractor

5-3	5-4	6-3	6-4	50¢
-----	-----	-----	-----	-----

3 Blade Pusher

6-3	50¢
-----	-----



MAXIMUM THRUST from ENGINE TORQUE

New Look in Batteries

(Continued from page 54)

for charge time is 750/Ic hours. We can see from the Charge Current column that the VO-500 may be charged from 10 ma to 40 ma. Let's assume we wish to charge at 35 ma. This is the Ic. For the charge time we simply divide 750 by 35 and get roughly 22 hours required for a full charge from a completely discharged battery.

The batteries can be charged for 90

days or more continuously at their recommended charge currents without damage. Therefore, it is ridiculous to worry about overcharging. All we need to know is how long to charge for a full battery charge. Since the charge state is rarely known following some use, the best way to insure a complete charge is to give a full charge the day before use, regardless of the charge state. The batteries may be recharged over 500 times; so if they were charged twice a week, they should last in excess of five years! In actual tests these batteries have been cycled over 5,000 times.

The charge currents and charge times apply if one or several batteries connected in series are charged. Repeating, do not increase the charge currents given when more than one battery is being charged. During the charge cycle, the batteries must be connected in series. They may be discharged in parallel, increasing the overall capacity. Batteries of varying charge state may all be charged in series at the same time. Different types of VO batteries may be charged simultaneously providing the maximum charge current is less than the maximum allowable current of the smallest battery being charged, and the time of charge is sufficient to charge the largest at that rate.

To the best of my knowledge, and in spite of advertising to the contrary, suitable chargers for the VO series batteries are not commercially available without some conversion. For those who wish to design their own charger, treat the batteries as if they had zero resistance and zero voltage. Use a power source with enough voltage to require a large series limiting resistor. In so many words, if one were charging four VO batteries, he should not use a 6- or 7-volt DC unregulated source. A 12-18V DC source with a series limiting resistor would

be preferable. The batteries normally will not be damaged by unfiltered half-wave rectification, although the large ripple causes some meters to read erroneously.

The following serves quite well as a charger and the parts may be obtained very reasonably from almost any electronic supply store and hobby shop. (See illustration.)

The maximum allowable circuit current is 55 ma. This charger may be used for charging up to six VO batteries on 12V DC input and nine VO batteries on 18V DC. The DC power source may be a model train power pack, 12-volt automobile battery, or virtually any such DC supply.

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1/2 A's
to 60's



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V1	Kwik Klip, Only	39¢
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CASE... with
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 - Assembly plan
 - Designed for RC or FF
- **J-7F RC Field box kit** **\$10.95** Post Pd.
- **J-7F RC Field box built-up** **\$17.95** Post Pd.

SEE YOUR DEALER OR ORDER DIRECT
BROADFIELD AIR-MODELS **ASHLAND, MASS.**

There is a definite precaution connected with discharging VO series batteries. Cell reversal and gassing can occur if several VO batteries connected in series are allowed to completely discharge. During the final discharge cycle, if one battery was to become discharged before the rest (which will surely happen), the circuit current would charge the discharged cell in reverse. Reverse charging produces gassing, and the battery would be ruined. The batteries should not be regularly discharged below 0.9v/cell. Thus, if two VO batteries were discharged in series (this is the normal servo discharge setup since the four VO batteries are center-tapped), they should not be discharged below 1.8 volts total. A quick check on the "C" discharge curve in Part 1 shows that 1-volt/cell is the lowest usable end point anyway. This would be two volts across the two VO batteries. Therefore, it is unlikely that this situation should ever be encountered in normal use.

1959 Internationals

(Continued from page 59)

num entry at each semi-finals in case of real bad weather, 20% of the local entry will be eligible to fly the second contest or semi-final.

Last month we reported on the Model Commission's vote for having three-man teams. With this in mind the International Competition Committee has redivided the country from the previous four sections to three sections. This is a difficult task and makes for more traveling on the part of a great many of the modelers. Geographical location, number of fliers in areas, number of semi-finalists and many other things were taken into consideration in coming

up with the redivided areas. Three sections finally were chosen, the heaviest weight given to the number of semi-finalists in a given area for the last few years.

The following are the suggested semi-final sites for each area: East—Baltimore, Md.; Central—Galesburg, Ill.; West—Fresno or Marysville, Calif.

The semi-final contest has been changed, so that 10 flights now will be used to determine the team members. In previous years this has been five flights. The 10 flights will be made over the two days. Five flights in each of the three events will be held Saturday, and the remaining five on Sunday. Flying will be by the round system, two hours being allotted for each round. Entrants flying two events must complete their two flights in the two-hour period. This would also apply to anyone who might be flying three events.

Ten flights will help to reduce the effects of weather, good or bad, and balance out the luck factor. It should point up consistency, thereby giving us a better all around team. Two days of morning, mid-day and late afternoon flying should present the contestants with all the types of weather one is liable to hit at the World Championship meet. One team member for each event will be selected at each semi-finals.

The World contest is set up for late August.

West Coast—Joe Bilgri, 256% Locust St., San Jose, Calif.;

Central—Lawrence Conover, 1632 First Ave. NW, Cedar Rapids, Iowa; Gerald Ritz, 9520 Greenwood Ave., Des Plaines, Ill.;

Southwest—Herb Kothe, 1309 Moore Terr., Arlington, Tex.;

East—Ed Dolby, 157 Union St., Rockland, Mass.

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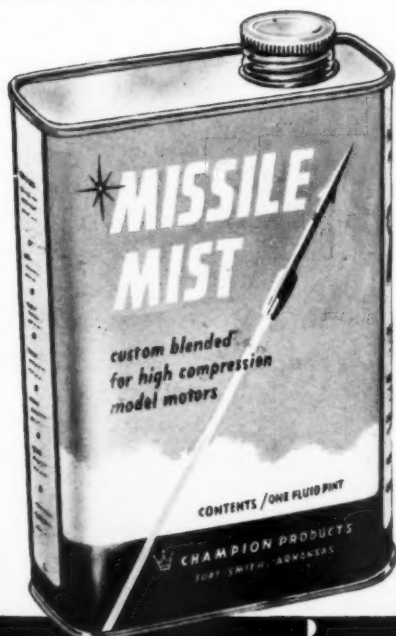
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